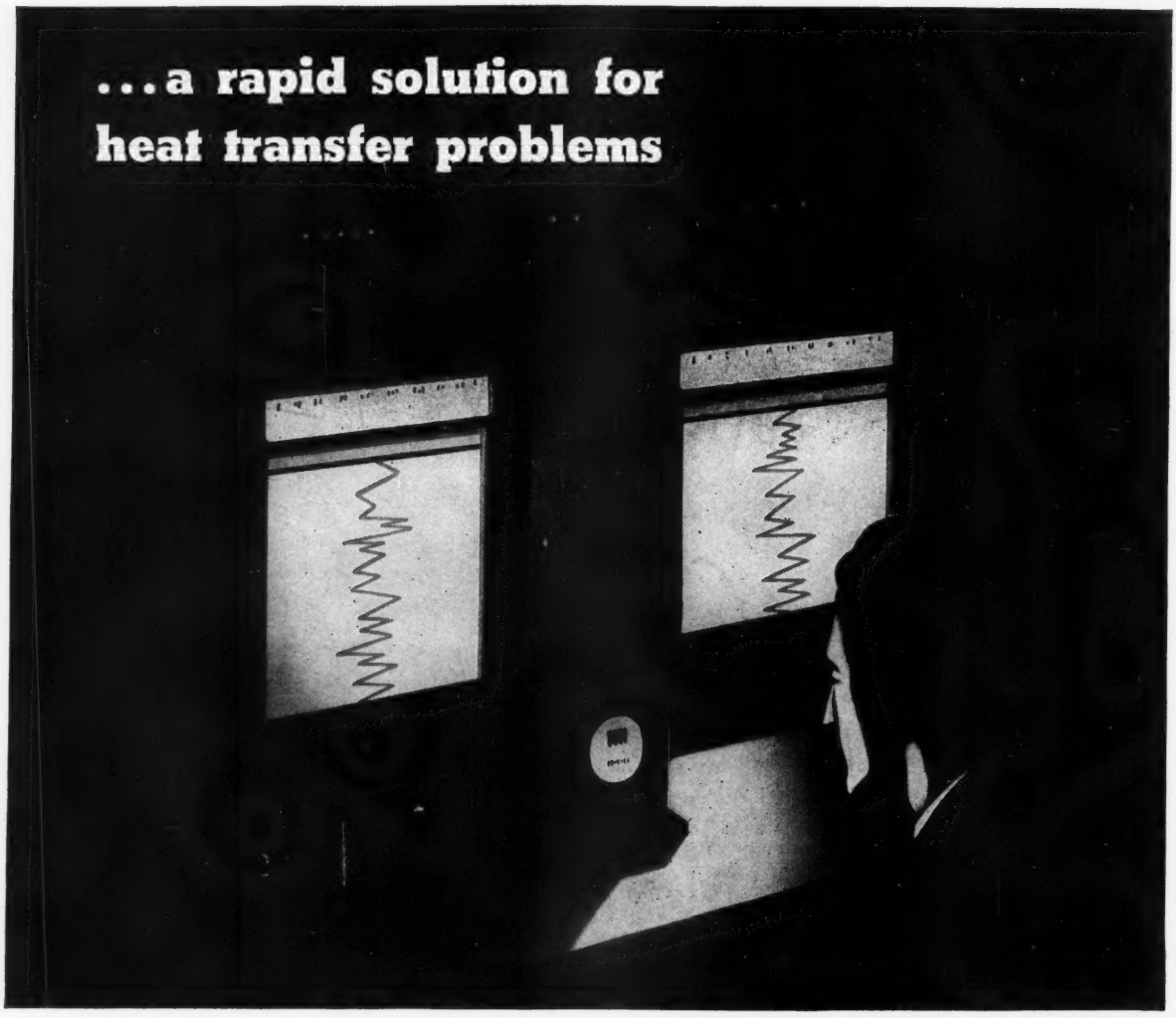
THE CORNELL ENGINEER

October, 1942
Volume 8—Number 1

COLLEGE OF ENGINEERING • CORNELL UNIVERSITY

...a rapid solution for heat transfer problems



Information supplied by "Mechanical Engineering"

Dr. Victor Paschkis, of Columbia University, has developed a rapid, inexpensive, and highly accurate method for the solution of heat-transfer problems.

Operation is based on the proved mathematical similarity of certain thermal and electrical phenomena. The method is accurate because easily made and recorded electrical measurements are substituted for difficult and erratic thermal measurements. When the temperature and thermal characteristics of substances are known, solutions are quickly obtained. But the method is also applicable to substances whose thermal characteristics are unknown.

Such diverse problems as heat loss in building materials, determining the time-temperature gradients in turbine rotors, or the thermal characteristics of plastics, are quickly and accurately solved.

CLIMAX FURNISHES AUTHORITATIVE ENGINEERING DATA ON MOLYBDENUM APPLICATIONS.
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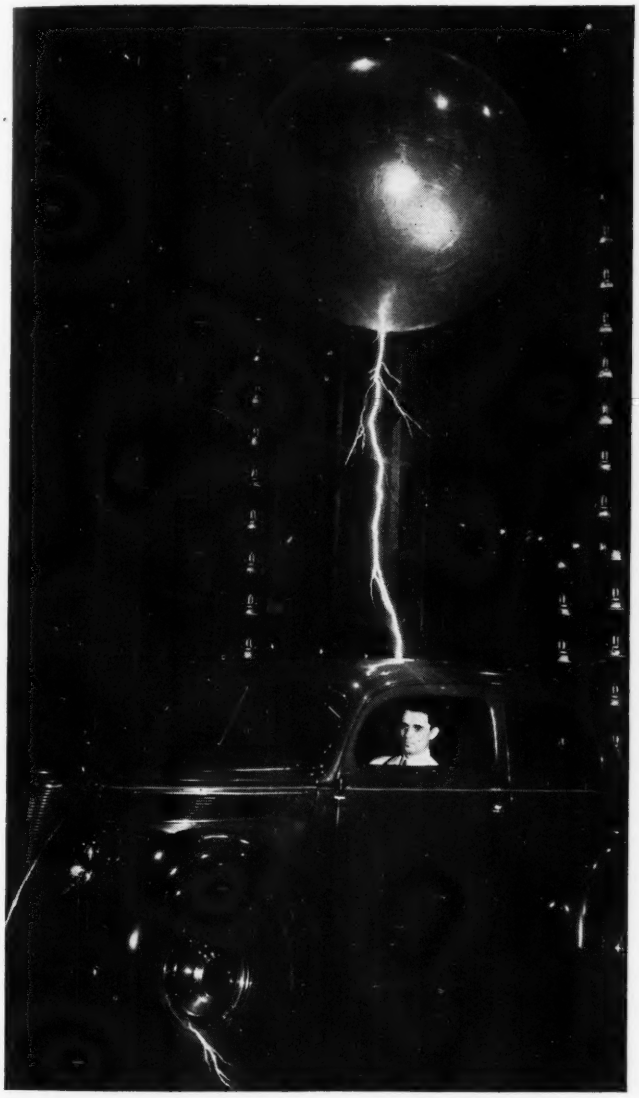
MOLY

Gilbert D. McCann, Ph.D., M.S.
...Master of Thunderbolts, too!



MODERN FARADAY CAGE. Three million volts of man-made lightning hit a car in Westinghouse High Voltage Laboratories, while Dr. Gilbert D. McCann sits safely at the wheel. Dr. McCann . . . co-inventor of the "fulchronograph" for timing and measuring the intensity of thunderbolts . . . joined Westinghouse in 1939, after receiving degrees of M.S. and Ph.D. at the California Institute of Technology.

EVERY TIME you take a breath, 175 thunderbolts crash to earth somewhere.

These lightning strokes, streaking down at 600 million miles an hour, are charged with torrents of electrical power . . . as much as 200,000 amperes, at pressures as high as 25,000,000 volts.

No wonder protection against lightning has been a major problem to utility companies . . . such a problem that, up to a few years ago, lightning frequently shut down power service to industry.

Today, a properly designed power line is not likely to be put out of service by lightning *more than once in 5 or 10 years!*

Dr. Gilbert D. McCann and Charles F. Wagner, Westinghouse engineers, have done much to make this possible through their studies of natural thunderbolts and laboratory lightning.

One of their contributions is the "fulchronograph" which automatically times natural lightning strokes and measures their intensity. Oscillographs and movie cameras also are used to photograph the celestial fireworks.

These mechanical "eyes" . . . perched high on the top of scores of tall buildings, smoke stacks, and transmission-line towers . . . are constantly collecting facts about lightning phenomena that were never known before. Facts about "cold" lightning, of terrific blasting power. Facts about "hot" lightning, the incendiary bomb of the sky.

Still further knowledge is gained from the study of *artificial lightning* . . . made in the Westinghouse High Voltage Laboratories. This man-made lightning is used to bombard insulators, lightning arresters, and other protective devices to test their efficiency.

These studies are constantly adding to the store of "know how" in the field of power transmission. As a result, Westinghouse engineers have been able to design and build lightning arresters and ground-wire systems that tame the wildest thunderbolt.

The work done by Dr. McCann is contributing mightily to America's war effort by helping to keep electric power flowing night and day to our vast war industries . . . as well as by protecting ordnance plants from destruction by lightning.

America needs scientists and engineers as never before . . . to help solve the technical problems of modern warfare and to rebuild the world when the last shot is fired.

Nearly 300 young engineering graduates joined Westinghouse last Spring to carry on this work. In the Class of '43 there will be many graduates who will have an equal chance to help win the war . . . and the peace to come . . . with Westinghouse.

Westinghouse

WESTINGHOUSE ELECTRIC & MANUFACTURING COMPANY, PITTSBURGH, PENNSYLVANIA • PLANTS IN 25 CITIES — OFFICES EVERYWHERE

Founded 1885

The CORNELL ENGINEER

Volume 8 OCTOBER, 1942 Number 1

Contents

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Olin Hall of Chemical Engineering

Olin Hall --- First of New Engineering Group

By F. H. RHODES
Director, School of Chemical Engineering

THE new Olin Hall of Chemical Engineering is an L-shaped building extending 274 feet along Central Avenue, with an east-and-west wing 226 feet long on Campus Road. The entire building is three stories high with penthouses at the north and south ends of the main wing to house the ventilating fans and the elevator motors. The exterior of the building is a combination of dark red brick and native stone.

The main entrances to the building are at the center of the main wing on Central Avenue, at the north end of the main wing, and at the south end of the building on Campus Road. There is also an entrance at the east end of the shorter wing.

In the main wing are the lecture rooms, recitation rooms, library, and computation room, and also a rather large number of small unit laboratories for use by advanced undergraduates and graduate students. The wing along Campus Road is devoted primarily to the Unit Operations Laboratory and its accessory facilities, although the top floor of this portion of the building houses the laboratories of microscopy and metallography. The freight elevator, serving all floors, and the stockroom for chemicals and apparatus are at the junction of the two wings so that these general service facilities are conveniently available.

The Unit Operations Laboratory extends for 104 feet along the north side of the east-and-west wing. The main part of this laboratory is 20 feet wide and is open from the basement to the third floor. A traveling electric crane operates on longitudinal rails at the top of this room. The available height below the crane rails is 36 feet. This laboratory is heated by unit blast heaters. This section provides ample headroom for tall semi-plant scale equipment, such as distilling columns and gas absorption columns. Service lines—steam, hot water, cold water, air, gas, 110-volt AC, and 220-volt AC—are brought down along the outer wall of the laboratory on the panels between the windows and also along the columns between the north bay and the middle bay of the building.

Immediately adjacent and parallel to this open section of the laboratory is another section of equal length and width provided with subway grating floors at the first and second floor levels. These gratings provide operating platforms for the taller apparatus and also make it possible to set up assemblies of apparatus at three different operating levels. The individual sections of the grating are removable to permit the erection of unusually tall equipment when necessary.

Accessory to the Unit Operations Laboratory is a pump and compressor room in which are housed the vacuum pumps and blowers to supply compressed air and vacuum to the main laboratory. An analytical laboratory, completely equipped for volumetric, gravimetric, and electrolytic analytical work, adjoins the Unit Operations Laboratory. Also adjacent to this laboratory are the pipe shop, the machine shop, the wood shop, and the storage rooms for shop supplies.

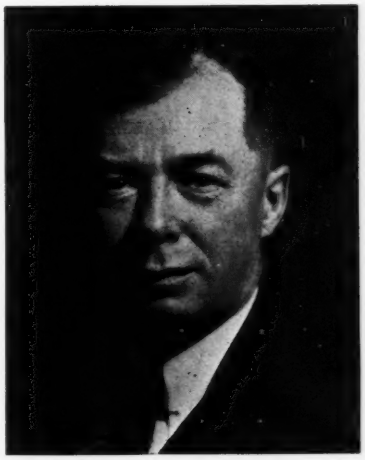
Adjoining the Unit Operations Laboratory on the second and third floors are unit laboratories for advanced undergraduate and graduate students. The office of the professor in charge of the work in the

(*Continued on page 26*)

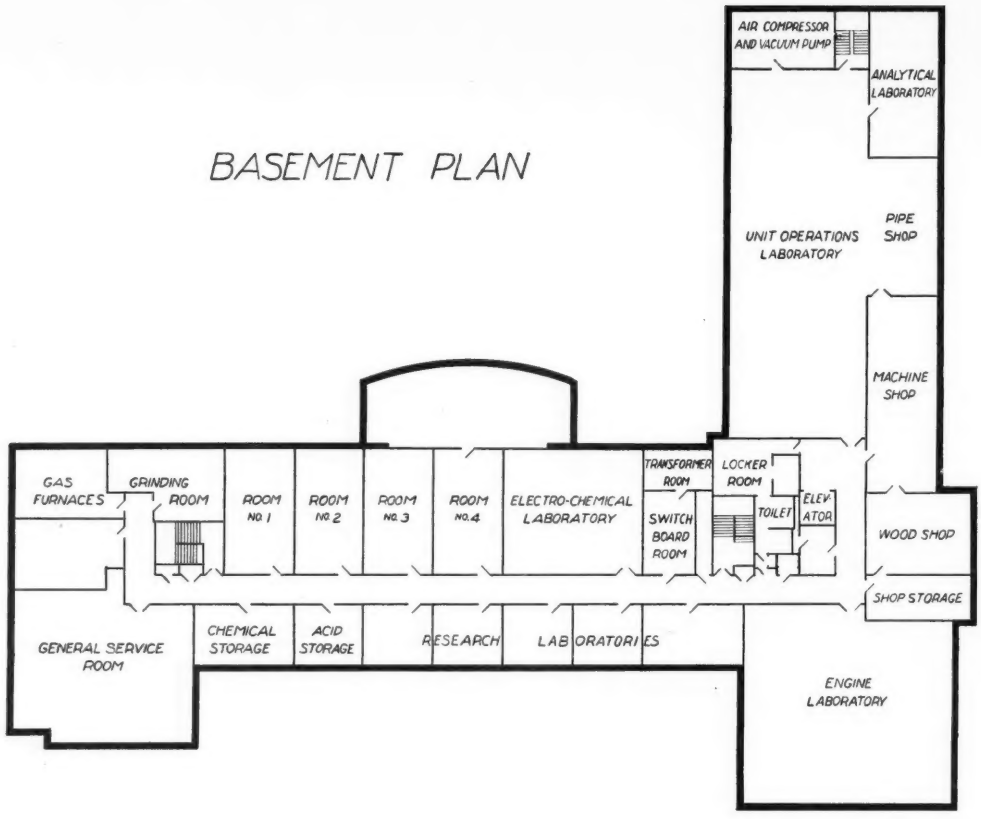
PROFESSOR F. H. RHODES, **although receiving an A.B. degree from Wabash College, has spent the major portion of his academic and teaching career at Cornell. After obtaining his Ph.D. here in chemistry in 1914, he served in various teaching and industrial capacities for several years. In 1920 he returned to the campus as professor of industrial chemistry until 1933 when he became professor of chemical engineering. He is class advisor for all chemical engineers.**

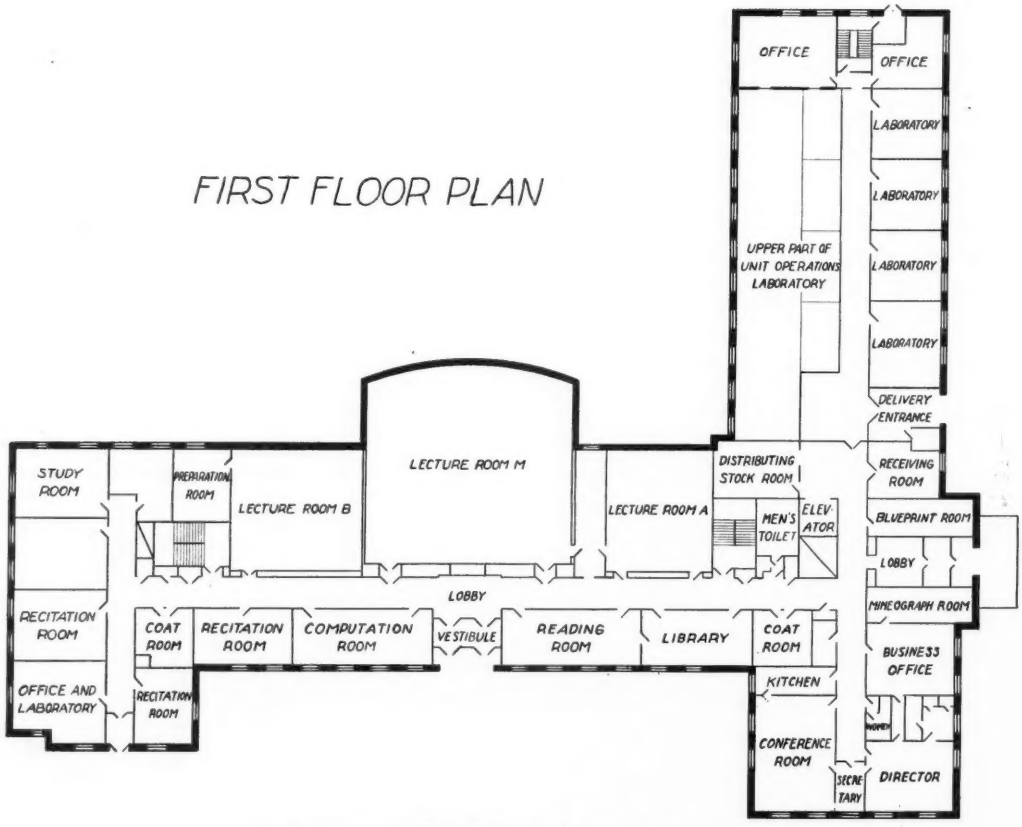
In 1938 Professor Rhodes was appointed Director of the School of Chemical Engineering and last spring was awarded the Johnson Professorship of Industrial Chemistry.

The author of numerous chemical patents, technical articles and books, he holds membership in many honorary societies including Tau Beta Pi, Sigma Xi, Phi Kappa Phi, and Phi Beta Kappa.

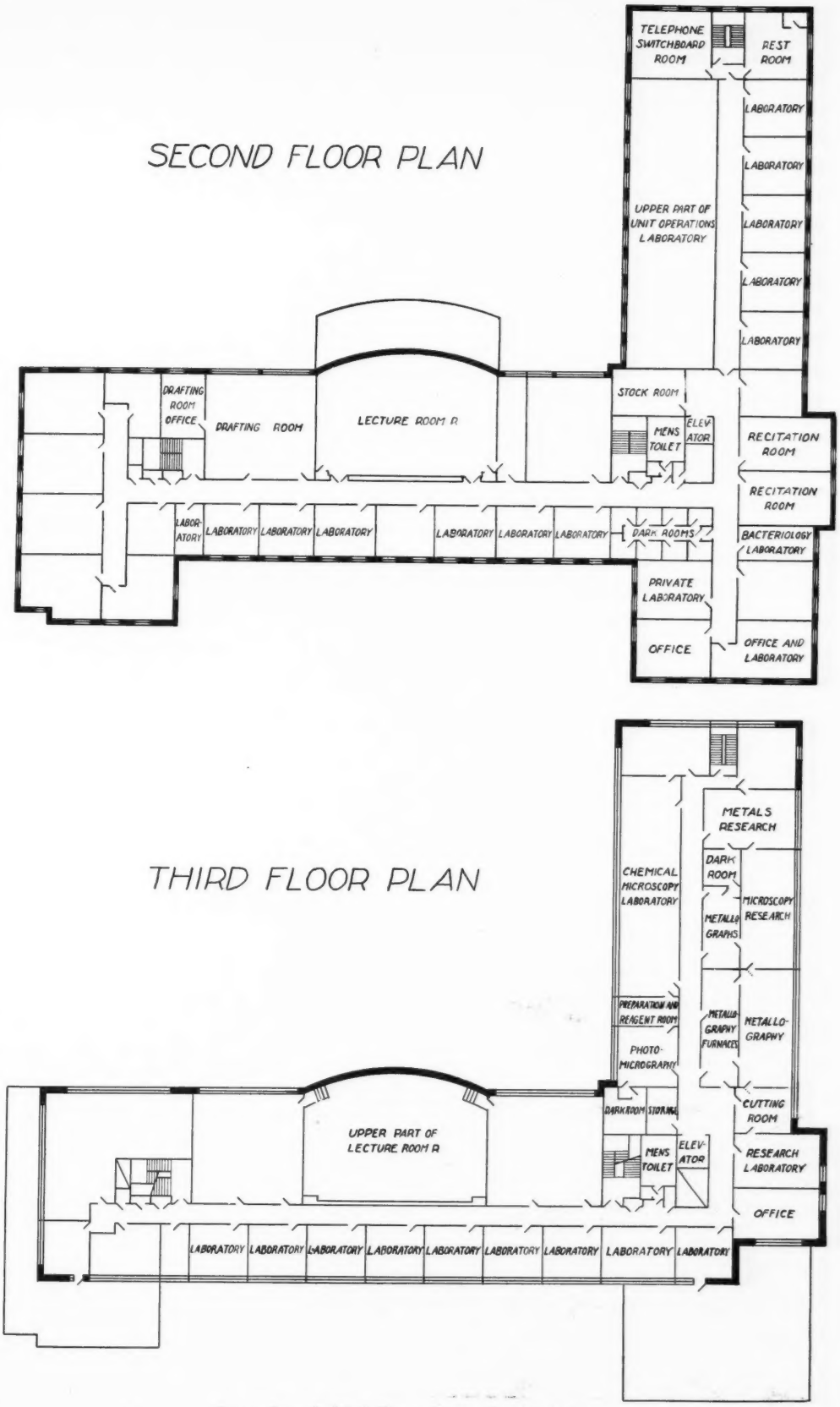


Professor Rhodes





Basement and first floor plans of Olin Hall



Second and third floor plans of Olin Hall

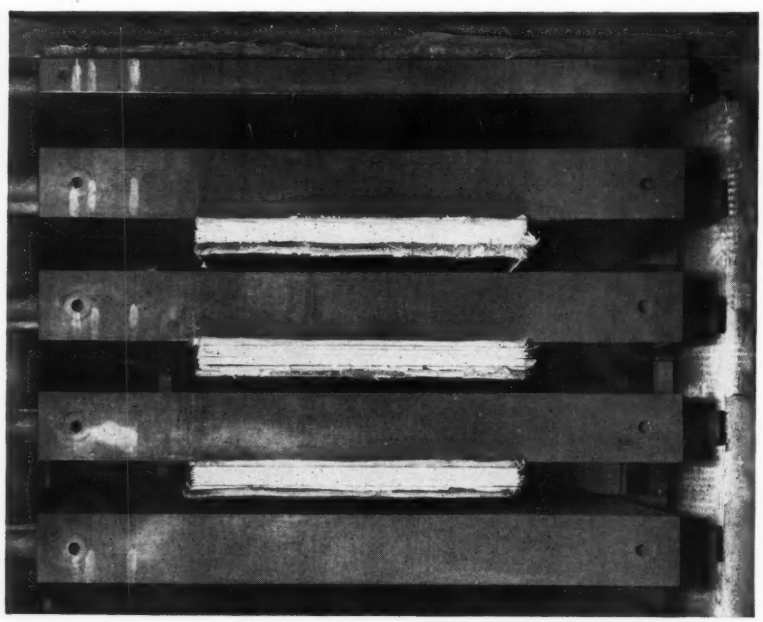
Compressed Wood Substitutes for Metal

By HARRISON PARKER, Chem E '46

MODERN developments and improvements in high density plywood production technique and improved resins and bonding materials have now become firmly established in many fields where, previous to the emergency and to wartime shortages, metal had held sway. New laminated impregnated veneers can substitute in many ways, and in some instances are more satisfactory than the metals themselves. Processes for improving the strength and properties of wood have just recently become a part of plywood technique, whereas metallurgy has far outstripped wood research in similar fields. Special metals have been developed for certain purposes, but it is only now that superior improved types of wood are being developed.

The problems of wood improvement, however, are very different from those of metals. Wood is strong for its weight in the direction of the grain, but weak across the grain. Strength is often distributed by standard plywood technique, i.e., by having the grain of adjacent layers of wood going in different directions. However, in many cases, laminated plywood, with the grains of the adjacent layers going in the same direction, has proved more useful. Thermosetting resins for bonding and adhesion add much strength beyond that of the wood itself. Ordinary veneer, when impregnated with a phenol formaldehyde type and compressed under heat, will develop properties comparable in the strength-to-weight ratio of 17ST aluminum and mild steel. It also has the advantage of insulating qualities particularly for electrical installations. Parts of machinery under water open a great field for this laminated wood because it has a very low moisture absorption and a complete lack of corrosion. It is very good for die blocks and for shaping soft metal and paper products.

Panels Ready for Pressing



Use In War Production

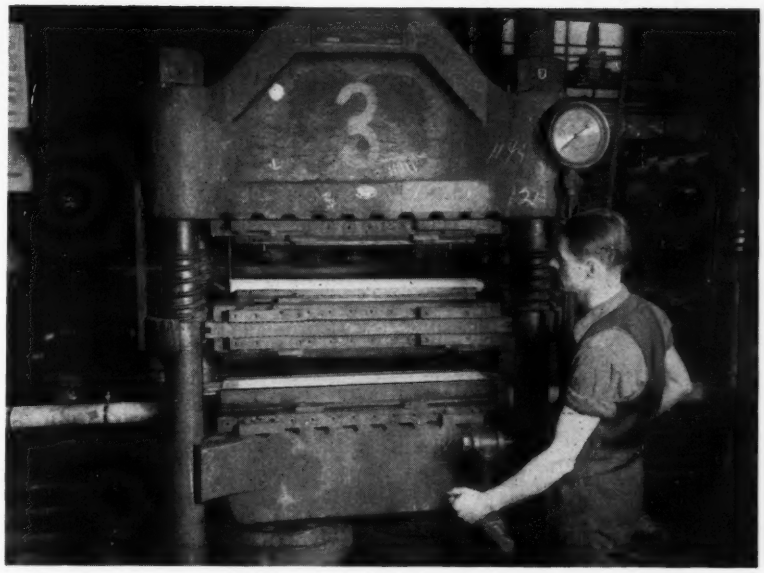
Its greatest use at present, however, is in war production, where it has shown excellent properties for use in aircraft. Laminated wood is excellent for propellor blades; there are many other applications for it within the fuselage. It can be used also for small boats such as landing craft, flare bases, and dies for thin metals.

The wood selected for this type of work must be of exceptional quality and only of a few given types, which have cell wall structures which are applicable and which will not give way under the pressures used. The wood must be clean, free from loose knots, and reasonably straight grained; though in many specifications the requirements are much higher. The quality of the wood necessarily depends upon the pressures to be used, as only the most excellent types of hardwood will withstand the highest pressures.

Birch is the most adaptable and desirable wood which is available in large amounts for the making of compressed boards. To name a few of the more common requirements, veneers which are cut from birch for use in this work must be of exceptional quality, must have no large or dead knots, no dote or streaks; the grain must not be excessively oblique; and the moisture must be about the same in all veneers. As there is not enough birch in the country to supply enough veneer coming up to the high stand-

ards required by aircraft, other woods have been experimented with; notably poplar, cottonwood, and gum.

Once the veneer has arrived within the plant, it must be checked for all the requirements; most important, however, is the moisture content. The individual pieces of veneer must be bone dry if satisfactory impregnation is to take place. There are a number of accepted methods for doing this. A breather type drier or an oven drier may be used, the temperature being kept above the boiling point of water for a specified length of time until the moisture is reduced to a minimum constant value. Immediately after drying, the veneers must be immersed in the resin to be used.



Panels After Pressing

Diffusion Must Be Complete

Since the demand for compressed wood has greatly increased, a number of new resins have been developed. The purpose of the resin is to fill the wood structure in all its cells so that when compressed under heat the resin will flow and set, thus restricting the wood and preventing it from returning to its original thickness after the removal of the pressure. The phenol formaldehyde resins, as stated before, are the best for this purpose. Resins are manufactured with both water and alcohol as solvents. The purpose of the solvent is to carry the resin into the cell structure of the wood. If this diffusion is not complete, the resulting panel will be poor. One must consider, however, that the solvent must be removed after the resin has been carried into the wood; water and alcohol each have their specific properties which make one or the other better in each special case. A solution containing 25% to 50% resin solids has been found highly satisfactory.

There are many methods of impregnation; two types, however, the soaking method and the pressure tank method, have been proven the most satisfactory. In the tank, proper precautions should be taken to see that complete impregnation takes place. The amount of time the veneer is soaked depends upon the percentage impregnation desired, and may be accomplished in from 12 to 48 hours. An impregnation of from 25% to 50% is recommended for most purposes. In the pressure tank method, the resin is forced into the outer pores of the wood and is then allowed to diffuse into the cell wall structure of the panels by being stacked from 24 to 48 hours. Thus the two processes, with all operations included, take about the same amount of time. However, the pressure type of impregnation requires special expensive equipment and its results are no more satisfactory than the soaking method.

After impregnation, the veneers must be dried to remove the solvent, using a combination of air and forced drying, which has been found to be most satisfactory. Air drying takes a long time, but care must be used in forced drying so as not to case harden and crack the panels, or polymerize the resin.

A very important part of the production procedure is the laying up of the panel. The two outside veneers must be straight grained; these are the faces, and tend to hold the panel flat. The intervening panels, or core, are chosen so as to balance the heart wood throughout the panel to insure even compression, as heart wood will not compress as easily as sap wood. The panel is then checked for specific gravity and changed by the replacement of certain panels to measure up to a certain final specified weight.

The final and most important step is the pressing. Varying techniques have been developed by different companies, but it is essential that these impregnated veneers be carefully handled and that the steam and pressure be so applied as to prevent splitting and burning and to insure a desirable flow of resin, which gives a perfect bond together with the desired compres-

(*Continued on page* 28)

		Specific Gravity	Modulus Rupture p. s. i.	Modulus Elasticity 10^6 p. s. i.	Compression p. s. i.
High Density Veneers	a.	1.23	30,933	3.39	23,550
	b.	1.33	40,233	4.13	22,450
	c.	1.35	38,700	3.67	28,400
Red Birch		.63	16.700	2.07	8,310
Aluminum 17ST		2.76	65,000	10.00	
Mild Steel		7.86	70,000	30.00	

Professor Mackey

Progress in the Mech Labs

By R. F. HOWES

CREATION of two departments in the Sibley School of Mechanical Engineering was announced recently by President Edmund E. Day, following a meeting of the executive committee of the Board of Trustees. Professor Charles O. Mackey was named head of the Mechanical Engineering Laboratory and Professor John R. Moynihan head of the Department of Engineering Materials.

"These two departments," Dr. Day said, "will absorb the functions of the former Department of Experimental Engineering and will also have additional functions demanded by recent advances in the two fields." Dean S. C. Hollister of the College of Engineering, in recommending the changes, pointed out that the field of materials and metallurgy is rapidly expanding, with new alloys and plastics and new processes constantly being developed. The same condition exists in the field of power generation and utilization. "It is therefore felt," he said, "that although the two departments are to some extent interdependent, they will have greater vitality if each is allowed to move forward under its own direction."

Mackey

Professor Mackey, who received his M.E. degree from Cornell in 1926, has been a member of the staff of the College of Engineering since 1924, when he was appointed instructor in experimental engineering, later transferring to the heat power department. He was made an assistant professor of heat power engineering in 1929 and a professor in 1936. Generally recognized as an expert in airconditioning, he has been a consultant for the Carrier Corporation, is the author of "Graphical Solutions" and numerous technical articles, and has collaborated with Willis Carrier, and with Professors W. N. Barnard and F. O. Ellenwood of Cornell on books on air conditioning and on heat power engineering. He is a member of A.S.M.E., Sigma Xi, Tau Beta Pi, and Phi Kappa Phi.

While directing the Mechanical Engineering Laboratory, Professor Mackey will retain his title as professor of heat power engineering and will continue his work in that department, where he offers a Heat Engineering Option open to seniors in the Sibley School of Mechanical Engineering. This option, started five years ago, has attracted increasing numbers of students interested in heat transfer, refrigeration, air conditioning, and fluid flow.

Moynihan

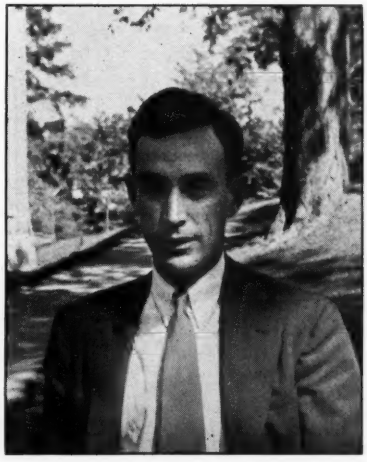
Professor Moynihan also received his M.E. degree from Cornell in 1926, and took his M.M.E. in 1932. He was instructor in experimental engineering in 1929-30 and 1931-1937 and assistant professor from 1937-1941, when he was given his present rank of associate professor. He has done commercial testing and research for several companies and is the author of "An Investigation of Chimney Performance" and of several technical articles. From 1935-1941 he was personnel adviser for the Sibley School of Mechanical Engineering, and for some time, beginning in 1941, he was assistant director of the ESMDT program, spending several months in direct charge of Cornell's training center in Buffalo. He is a member of Tau Beta Pi, the American Society for Metals, Sigma Xi, and the Society for the Promotion of Engineering Education.

Thurston

The two new departments stem directly from the engineering laboratories which Robert Henry Thurston established at Cornell when he came to the University as director of Sibley College in 1885. Thurston, who had previously organized a pioneer laboratory at Stevens Institute, developed his program at

(*Continued on page* 28)

Professor Moynihan



THE COLLEGE

Mr. F. W. Olin, C.E. '86

Olin Hall Dedication

OLIN HALL of Chemical Engineering will be officially dedicated on October 3, President Edmund E. Day has announced. The building, one of the largest on the campus, is the gift of Franklin W. Olin of Alton, Ill., president of the Western Cartridge Company and affiliated concerns.

Because of the war, the exercises will be brief and informal, but a group of distinguished industrial and educational leaders will take part. Speaking on behalf of American industry will be John L. Collyer of Akron, Ohio, president of the B. F. Goodrich Rubber Company. Mr. Olin will be in Ithaca to present the building to the University and to unveil an inscription dedicating the structure to Franklin W. Olin, Jr., a son who died in 1921. Other speakers will be President Day; Edward Babcock, chairman of the Board of Trustees; Dr. Fred H. Rhodes, Herbert Fisk Johnson Professor of Industrial Chemistry and Director of the School of Chemical Engineering; and Dr. S. C. Hollister, Dean of the College of Engineering at Cornell.

Mr. Olin is a trustee of Cornell, from which he received a C. E. degree in 1886. His three sons, John, Spencer, and Franklin, also took degrees at Cornell. The first two, who are associated with their father in business, are expected to attend the ceremony. Mr. Collyer, like the donor of the building, is a Cornell alumnus and trustee.

The new building, which will receive regular students for the first time this fall, is designed to accommodate 450 undergraduates, as well as a proportionate number of graduate students in chemical engineering. Olin Hall is the first building in a proposed new physical plant for the College of Engineering. Plans for four additional buildings have been prepared, and construction is expected to be resumed after the war.

Military Camouflage

MILITARY camouflage, a new university subject inaugurated this summer, has proved so successful that it will be continued this fall. Some of the students who completed the work are already putting it to good use in the armed forces.

A large outdoor demonstration area has been developed near the University where, if you're not careful, "You are apt to slip into a trench without knowing it is there," says Professor J. P. Porter, in charge of the course.

The entire set-up aims for the teaching of modern camouflage as related to tactical military operations and military installations. The students learn how to camouflage a fox hole hiding an anti-tank gun, to lay flat-top nets to hide big artillery, to cover trenches and make them invisible, to hide sections of roads, to screen roads to offset lateral fire, to make decoy guns to draw enemy fire, to conceal trucks, to make and employ dummy planes, and to protect command posts

In indoor exercises, they build models and dummies of war weapons, learn about camouflage painting, analyze forms and shadows of natural objects and what they mean, study aerial photography, topographic maps and plant materials, and learn the use of stereoscopes.

J. P. Porter, professor of ornamental horticulture in the State College of Agriculture, developed

COMPETITION NOTICE

On Tuesday, October 6, our fall competitions are being opened to freshmen and sophomores, leading to positions on our editorial and business staffs.

Freshmen: In order to realize the most out of college life, it is essential that you get into some extra-curricular activity which will enable you to make friends and learn how to work with others toward a common end. You will not only gain valuable knowledge and make contacts with the alumni, professors, and eminent students in the College, but you will also find journalism an interesting and enjoyable activity. The College has inaugurated a new program in which the board members of **The CORNELL ENGINEER** will receive University credit and also the benefit of competent instruction in journalism and business methods.

Sophomores: Cornell is no longer strange to you—you are fully aware that this is the last year in which you can get into an activity and make yourself eligible for honorary societies. It is still not too late to take advantage of this excellent opportunity.

the course after an intensive training period at Fort Belvoir, Va., under the direction of U. S. Army Engineers camouflage battalion. He was the first civilian to apply and the only one trained. He has followed the art and science of camouflaging ever since World War I.

Selection of students for the course is on the basis of how quickly they expect to get into the service. Numbers are limited because of the lack of indoor laboratory space. This summer, students of engineering, law, arts, and agriculture led in enrollments. Camouflage materials used include both the natural and artificial. Concerning the latter, the students find out how useful are such things as fishnets, colored bits of cloth, and chicken netting, and they are taught how to employ snow fences and farm fences in concelaing objects from the enemy.

New Diesel Lab

THAT big hole they're digging on the west end of Armory green is the beginning of a $30,000 Diesel Engine Laboratory to be used in the ESMWT course for student officers in the Naval Training School here.

The building, of temporary wood construction, will be 54 by 95 feet. The interior of the single story will be high enough to allow the installation of overhead trolley rails for hoists used in tearing down and reassembling large Diesel engines. The engines themselves will be installed in six large and four small bays opening toward the center of the building. In some instances, two engines will be set up in such a way that they can use the same dynamometer. The building will contain locker, tool, and supply rooms.

For equipment, the U. S. Navy has made available nine Diesel engines, some of which are the latest types used on naval craft, as well as other accessory equipment. Ten other Diesel engines are already on the campus, having been secured by the College of Engineering directly or through the U. S. Office of Education. Equipment will be concentrated in the new laboratory on completion, making it, according to Lieut.-Commander Arthur S. Adams, who directs the course, of maximum effectiveness in carrying on practical Diesel engine instruction.

The location of the laboratory will be especially convenient, since the new internal combustion engine laboratory, used by student officers in preliminary training in the same course, is located at the south end of the basement of Olin Hall. The new building is also near the classrooms used by student officers in Olin and Myron Taylor Halls.

Pitching a little - - - penny?

Faculty calesthenics by Charlie Scott, Jeanette Obrien, George Hanselman, Ruth Brockway, Franny Rea, and Charlie Mackey.

College Raises Standards

THE new rules of the College of Engineering are substantially the same as those of last year except for part of article 43, which reads as follows: "A student in the School of Civil Engineering, Mechanical Engineering, or Electrical Engineering who does not receive a passing grade in every course for which he is registered or who fails in any term or summer session to maintain an average grade of 65, with at least half the hours at 70 or better, may be dropped or placed on probation."

Faculty Changes

DURING the summer months there have been numerous changes in our engineering faculty. Professor Francis J. Seery has become an emeritus professor. Professor Seery, of the department of hydraulic engineering in the School of Civil Engineering, has been a member of the Cornell faculty since 1905. Begining his experience as a rodman in the city engineer's office of Waterbury, Conn., he became inspector of construction during eight years of service there, and then went to Panama to explore the Darien jungle for alternate routes for an Isthmian Canal. On his return, he resumed his position in Waterbury, but soon entered Tufts College, receiving a B.S. degree in civil engineering in 1905 and coming to Cornell after a summer as assistant engineer on the Barge Canal.

L. Donald Doty, employed since 1934 by the U. S. Army Engineers on various projects, has been appointed associate professor of hydraulic engineering in the School of Civil Engineering. Professor Doty received his B.S. in C.E. degree from Denison University and his master's and professional degrees in civil engineering from the University of Illinois. He has had three years' teaching experience at the latter institution and was act-

The Dean's Welcome to the Entering Class

SINCE the class of 1945 came to us, this country has been plunged into an unsought war. It is a war in which technical equipment and technical skills are employed as never before. Great numbers of physicists, chemists, and engineers are needed by industry and by the armed forces.

You who now embark upon an engineering training do so at a time when the best that is in you is needed by your country, whether you are destined to serve in the lines or behind the lines. It behooves each of you—in fact, it is your duty—to make the most of the engineering training that is now available to you. Make and keep yourself strong, physically and mentally. Build yourself in all possible ways for the high privilege of service to your nation.

You are joining a great company of Cornell Engineers who have built a notable tradition of achievement in their chosen fields. Over the years ahead you will come to realize with growing appreciation the measure of prestige which those who have gone before you pass on for your enjoyment. With this privilege also goes the responsibility for the preservation of this tradition of high achievement. Cornell is proud of the service of her engineers, both in war and in peace.

I extend a sincere welcome to you all. I have abundant faith in your ability and in your determination to carry on the Cornell way of service.

S. C. Hollister
Dean of College of Engineering

Sincerely yours,
S. C. HOLLISTER, *Dean*

ing head of the department of engineering at Denison for one year. Before coming to Cornell he was assistant civil engineer in charge of economic surveys and reports on flood control projects in the Arkansas River Watershed, working out of the U. S. District Engineer Office in Tulsa, Oklahoma.

Herbert H. Williams, who has been Director of the Cornell University Placement Bureau since 1933, has been appointed administrative assistant to Dean S. C. Hollister. Williams is a member of the Cornell class of 1925 in Civil Engineering. After graduation he was employed by the Port of New York Authority for seven years before returning to the University. He will continue as director of the Placement Bureau.

Charles E. Clarridge, instructor in civil engineering at Clarkson College of Technology, Potsdam, N. Y., has been appointed assistant professor of hydraulic engineering in the School of Civil Engineering at Cornell. Professor Clarridge received his bachelor's degree in civil engineering from Clarkson in 1930 and his master of science degree in 1931. On the teaching staff of this institution since that time, he has also taught in summer survey camps.

Dean Hollister has also announced the appointment of Daniel F. Langenwalter and Stanley L. Schauss as instructors in the School of Electrical Engineering. Langenwalter, a graduate of Georgia School of Technology with the degree of B. S. in E. E. in 1941, has been at Cornell during the past year as a John McMullen Graduate Scholar working for his master's degree. Schauss is a graduate of Cornell with the degree of Electrical Engineer in 1927. He has been an instructor on the staff of Cooper Union Institute of Technology, teaching physics and its application to engineering.

H. J. Loberg, C. I. Millard, and R. Y. Thatcher have been advanced from assistant professors to associate professors, and A. B. Credle, W. A. Johnson, T. A. Ryan, H. G. Smith, and J. H. Smith from instructors to assistant professors. Assistant Professor H. N. Fairchild has been transferred from the department of heat power engineering to the department of experimental engineering.

There have also been three resignations: M. Goland and R. P. Molt from the Sibley School of Mechanical Engineering, and C. Robertson from the School of Electrical Engineering.

Scholarships

About 125 students in the College of Engineering have been awarded scholarships during the summer. These include 57 John McMullen Regional and Industrial Scholarships, 48 New York State Tuition Scholarships, and a number of other awards made by the University from various funds. The State Cash Scholarship list has not yet been announced, and the lists given below, as of September 14, are still subject to minor revision.

JOHN McMULLEN REGIONAL SCHOLARSHIPS

District No. 1 (New England)

Richard Durfee Borden,	Fall River, Mass.
Halbert Emerson Payne,	Greenwich, Conn.
Richard Kent Smith,	Milton, Mass.
Robert Gregg Williamson,	Springfield, Mass.

District No. 2 (Pennsylvania)

Lewis Bonsall Beatty, Jr.,	Media, Pa.
George Richard Bollinger,	Tarentum, Pa.
Harvey Lewis Miller,	Harrisburg, Pa.
Robert Walling Mosher,	Erie, Pa.
Lewis Clayton Thomas,	Kingston, Pa.

District No. 3 (New Jersey)

Charles Clarke Ambrose,	Westfield, N. J.
Paul Theodore Atterid,	Chatham, N. J.
John Winthrop Drew,	East Orange, N. J.
Thomas Strycker Meiss,	Westfield, N. J.
Donald Edward Oberg,	South Orange, N. J.
William Raymond Parlett,	Plainfield, N. J.
Peter Pfounts,	Summit, N. J.
Ross Owen Runnels, Jr.,	Maplewood, N. J.
David Cothoudt Stanley,	Union, N. J.

District No. 4 (Delaware, Maryland, Virginia, District of Columbia)

Wilson T. Ballard, Jr.	Owings Mills, Md.
Roy Scotton Griffin,	Dover, Delaware
Seth W. Heartfield, Jr.,	Baltimore, Md.
Frederick William Koch,	Baltimore, Md.
James G. McMillan, Jr.	Claymont, Del.
William B. Richardson,	Bethesda, Md.
William R. Richardson,	Baltimore, Md.
John Lang Taylor,	Baltimore, Maryland

(*Continued on page* 30)

Freshmen . . .

YOUR CLASS ADVISERS

Professor Meserve

Electrical Engineers

FRESHMEN in EE, meet Assistant Professor W. E. Meserve, your class adviser. By no means as stern as the rugged countryside of his birthplace, Gorum, Maine, this affable New Englander is known throughout the College of Engineering for ability and fairness.

Professor Meserve graduated with honors from the University of Maine with the degree of Bachelor of Science. He then went to New York City to work in the Bell Telephone Laboratories. After two years in New York, he returned to his alma mater as an instructor in electrical engineering and while there obtained his degree of Master of Science. Professor Meserve came to Cornell as an instructor after two years at Maine. Additional sheepskins were acquired during his instructorship, the list being completed with the M.E.-E.E. and Ph.D. degrees, and the assistant professorship in electrical engineering.

All his time had not been spent in teaching, for Professor Meserve has had a wealth of practical experience. He has put in a number of summers in the general engineering laboratories of the General Electric Company, and has done considerable testing of equipment for the R.C.A. Victor Corporation. While associated with the American Brown-Boveri Company, Professor Meserve did research and development work on mercury-arc rectifiers.

Quite a large number of technical articles have appeared over Professor Meserve's name. He has written on photo-voltaic effects, copper oxides, flicker measurement of light sources, and aluminum cells, to name just a few. As the result of his researches and writings, Professor Meserve is listed in *American Men of Science* and in *Who's Who in Engineering*.

Although quite busy at present with his regular courses and those which he teaches for the USNR Diesel and Communications Schools, Professor Meserve finds time to work at his present research project, which is dry-disk rectification. He is a licensed professional engineer in the State of New York and a member of the American Institute of Electrical Engineers. He is on the rolls of the honorary societies Tau Beta Pi, Sigma Xi, and Phi Kappa Phi.

Professor Meserve was a faculty advisor and also a contributor to the *Sibley Journal of Engineering*, to which the CORNELL ENGINEER is successor. His hobbies are the refinishing of antique furniture and hiking, which he combines with a third, motion picture photography. Professor Meserve is married and has one son.

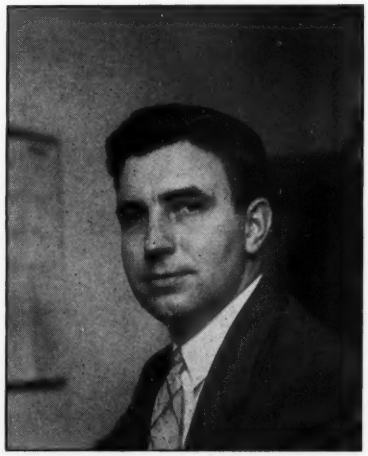
Mechanical Engineers

MECHANICAL Engineers of '46, meet your class adviser. He's your trouble shooter, and he wants to help you. We first knew Professor Walter A. Johnson when he was our kinematics instructor. However, he has recently been advanced to assistant professor of kinematics and machine design—and for good reason.

Johnson has been spending his extra hours doing design work for his own consulting company. Working long hours, he has produced a vibration machine for testing aircraft and tank apparatus subject to simple harmonic vibration. He feels that it is necessary for a man to practice engineering if he is going to teach it. He says, "If we are to produce engineers, and not just students, our faculty must keep in actual contact with practice."

"Wally" Johnson spent his undergraduate years at the University of Illinois, where he was chairman of the A.S.M.E., and active in the

Professor Johnson



student engineers council. After receiving his B.S. in M.E. degree at Illinois, he went to Columbia University for his masters degree. These years at Columbia were spent doing research in the cutting of metals. Putting his findings to immediate use, Johnson spent the next three years running his own shop, in which he made special machinery.

Professor Johnson arrived at Cornell in September, 1940. He likes his home here, and finds its location convenient for his hobbies of hunting, fishing, and boating.

Johnson believes that industry is getting caught up in its war production and that the real demand for men with technical training will be made by the Army and Navy to operate and maintain the mass of special equipment in the field. To the M.E.'s of '46, Professor Johnson makes the following statement: "Preparation for this war work is the job of you entering engineers. One out of every three mechanical engineers in the class of '45 is not privileged to return this fall—mostly due to 'busts'. Let's try to do a better job this year."

Civil Engineers

CLAUDE M. Pendleton, six foot three professor of civil engineering, will serve as CE freshmen adviser. "Spike," as he has been known ever since high school days, first entered Cornell as a freshman in 1914. He is a native of Binghamton, N. Y., and graduated from Binghamton High School. He graduated in CE at Cornell in 1918.

Professor Pendleton

In his undergraduate days, he was interested in track and boxing. He was a member of Pyramid and the Hillhurst Club which was a local engineering fraternity until disbanded during World War I. He is also a member of Chi Upsilon, honorary Civil Engineering fraternity, and the American Concrete Institute. Professor Pendleton is married and has five children—four sons and one daughter. His oldest son, Dick, graduated last May from the College of Agriculture specializing in entomology.

Professor Pendleton taught geology in the Arts School in his senior year and except for a leave of absence in 1923 has remained with the University ever since. Classes in Civil Engineering were much larger then, he recalls, with as many as 140 entering the freshmen class compared to approximately 80 entering this fall. During his summers as an undergraduate he worked for the Engineering Office of the City of Binghamton and The Cortland County Highway Department. This work was mostly surveying and design work.

To date Professor Pendleton has taught over twenty courses but his favorites are courses in structural engineering and surveying.

He takes great pride in his hobby which is a most unusual one. He raises tropical fish and sells them at a profit. In his home he has over twenty aquariums in which he raises his rare specimens. When not occupied by his aquariums, he likes to go fishing and sailing. With his son Dick, Professor Pendleton is contemplating building a cabin sailboat some 27 feet long. This boat will have an auxiliary motor and bunks, making it possible to take overnight cruises on Lake Cayuga.

Professor Pendleton is anxious to meet all freshmen in CE and they will find it very easy to get acquainted with him.

M. W. Sampson

Administrative Engineers

MARTIN W. Sampson '39, adviser to the incoming students in Administrative Mechanical Engineering, is an architect 'gone straight.' A native Ithacan, 'Marty' entered the College of Architecture at Cornell after graduating from Lebanon Preparatory Academy in 1933. At that time, his father was Professor of English and head of the Department of English in the College of Arts and Sciences here.

After two years in architecture, Marty saw the error of his ways and transferred to engineering. He graduated in 1939 with the degree of B.S. in A.E. While an undergraduate, he was a participant in track and cross-country and a member of the Cross-country Club.

Following his graduation, Marty went to Buffalo and worked in the plant engineering department of the Chevrolet Assembly plant, his specialty being layout. In February of 1941, Marty returned to Cornell to instruct in the Engineering Defense Training courses, now called the Engineering, Science, Management War Training courses, (ESMWT) and in Administrative Engineering. He now teaches Technical Writing and Business Industrial Management.

Last summer, Marty and Ann Beers '39 were married. In his free time, Marty likes to sail, and was a familiar figure on the Cayuga waterfront this last summer.

Ore for Giant Aerial Torpedoes and bombs is mined with Allis-Chalmers equipment.

One of many new Allis-Chalmers ste
turbines which are helping to power
greatest war production effort in histo

Bundles for Berlin... Power for Pittsburgh!

ALLIS-CHALMERS EQUIPMENT HELPS MAKE BOTH

"A. HITLER, BERLIN, GERMANY" That's what we'd like to label just one of the thousands of tons of ore which Allis-Chalmers equipment is helping to mine and turn into aerial torpedoes and bombs!

And that turbine above is another Allis-Chalmers product that will soon be turning out trouble for Hitler—supplying power to great war plants—helping to make America's soldiers the best equipped in the world.

These are just two examples of how thou-

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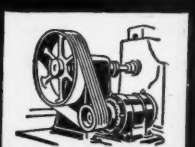
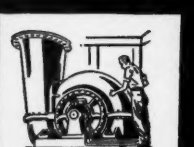
OFFERS EVERY MANUFACTURER EQUIPMENT AND ENGINEERING CO PERA

ELECTRICAL EQUIPMENT

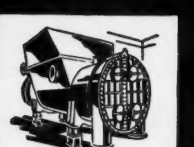
STEAM AND HYDRAULIC TURBINES



MOTORS & TEXROPE V-BELT DRIVES



BLOWERS AND COMPRESSORS



ENGINES AND CONDENSERS

CENTRIFUGAL PUMPS

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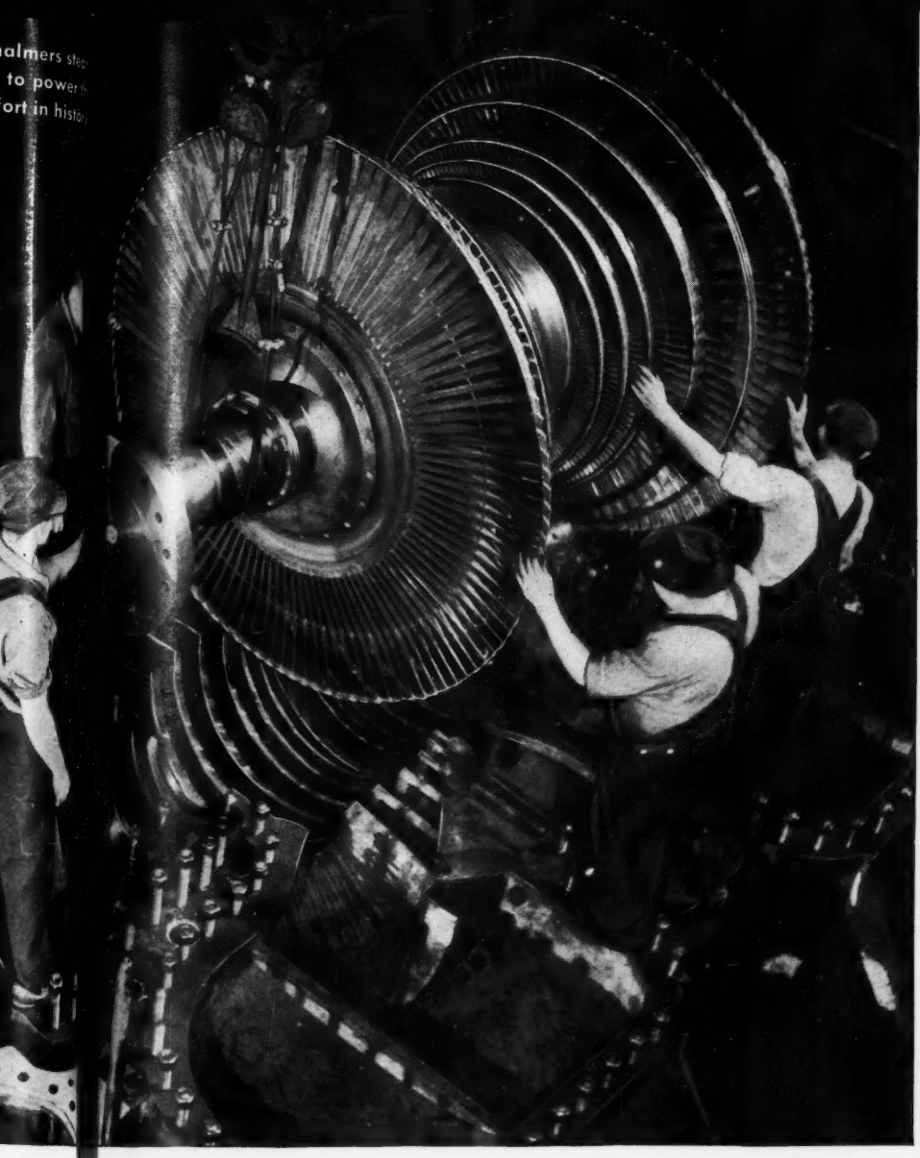
MILL

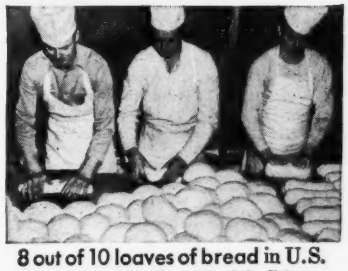


sands of Allis-Chalmers people are fighting the Axis—are *working for Victory!*

Over 1,600 Allis-Chalmers products are working in the Battle of Production. And our Cooperative Engineering service is helping makers *produce more*—not just with new machines, but with *machines now on hand!*

This production experience will be of added value when the war is over. We work for Victory—we plan for Peace!

ALLIS-CHALMERS MFG. CO., MILWAUKEE, WIS.



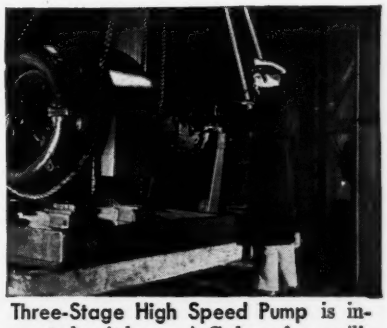
8 out of 10 loaves of bread in U.S. are made with the aid of A-C farm and flour mill equipment.

VICTORY NEWS

Washington, D. C. — Keels for more than 140 "Liberty" ships have been laid and more than 60 ships have been launched from ways which did not even exist before 1941. Original schedules have already been more than doubled.

To set the fastest shipbuilding record in history, mass production principles are used. More than 500 makers are feeding parts to Liberty ways.

From Allis-Chalmers, one of the most important of the contributing firms, comes products ranging from machine-gun cooling pumps to propulsion shafting.



Three-Stage High Speed Pump is inspected as it leaves A-C shops for a military destination. Equipment includes Allis-Chalmers motors and switchgear.

Milwaukee, Wis. — Mosquito boats no longer have to use their motors to recharge their batteries—small Allis-Chalmers rectifier units now do this job.

This unit is the newest means of obtaining nominal d.c. current from existing a.c. power lines. It eliminates need for keeping ships motors running for battery charging on shore. It also aids coast defense by helping to supply power for shore searchlights.

Industrial plants are also using the new unit to supply small amounts of d.c. for individual drives on planers and other machines, in laboratories for testing purposes, and in tool rooms.

FOR VICTORY
Buy United States War Bonds

HALMERS

WE WORK FOR VICTORY — WE PLAN FOR PEACE

ING CO PERATION TO HELP INCREASE PRODUCTION IN THESE FIELDS...

FLOUR AND SAW MILL EQUIPMENT

CHEMICAL PROCESS EQUIPMENT

CRUSHING, CEMENT & MINING MACHINERY

BOILER FEED WATER SERVICE

POWER FARMING MACHINERY

INDUSTRIAL TRACTORS & ROAD MACHINERY

CORNELL SOCIETY of ENGINEERS

107 EAST 48TH STREET NEW YORK, N. Y.

"The objects of this Society are to promote the welfare of the College of Engineering at Cornell University, its graduates and former students and to establish a closer relationship between the college and the alumni."

President's Message

Fellow Cornellians:

This is my first letter to you as president of your Society. It seems most fitting that I should express on behalf of the other officers our appreciation of the honor which has been bestowed upon us. I assure you that we will do everything we can, in spite of the trying conditions existing today, to carry on the affairs of the Society in a successful and satisfactory manner.

We hope that as a result of our efforts the usefulness of the Society to the College of Engineering will be enhanced and that a stronger bond between the College and the alumni may be developed. We pledge to do our best and trust that the Society will continue to grow in strength and effectiveness during the coming year.

The headquarters of the Society are in New York City but we have four healthy regional groups with their centers of activity in Philadelphia, Newark, Pittsburgh, and Syracuse. As soon as practical, it is the plan of the Society to extend this regional group idea. We find that it not only enlarges our membership but affords an excellent opportunity for Cornell engineers to become better acquainted in their own community.

Speaking of members, it is of interest to note that your Society has 300 more members now than it had at this same time last year. We confidently expect that this year will give us a record in total membership.

George N. Brown, '08

GEORGE N. BROWN is the new president of the Cornell Society of Engineers. He graduated in 1908 in electrical engineering and from that time until 1916 was associated with the New York State Railways Co., where he became chief electrical engineer. As a member of the 1st ew York Cavalry (National Guard) he spent a year on the Mexican Border, returning in 1917 to attend the first officer's training camp at Madison Barrac'-s, N. Y. With a First Lieutenant's commission in the U. S. Engineer Corps, he was assigned to the 7th Division at Camp Dix, N. J. Early in 1918 he went overseas as a Captain and saw active field service up to the time of the Armistice.

For ten years he was associated with the Pittsburgh Transformer Co., first as manager of the New York office and then as vice-president in charge of sales located in Pittsburg, Pa. Returning to New York, he joined the Edison Electric Institute (an association of electric utility companies) in an executive capacity. Four years later he re-entered the transformer field, representing Moloney Electric Co. of St. Louis, Mo. in the New York territory.

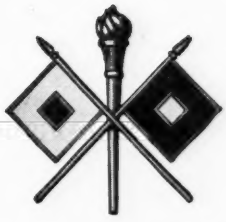
He is a member of the Maplewood Country Club, Cornell Club of New York, and the American Institute of Electrical Engineers.

With its attractive presentation and with its high quality of articles, THE CORNELL ENGINEER should be read by all undergraduates and alumni of the College of Engineering. When you consider that eight issues a year of this excellent magazine are delivered free of charge to each member of the Society you rightfully wonder why the increase in membership this year has only been 300. I think it should be ten times that number. Plans are now under way to publicize more broadly among our engineers the benefits derived from membership in the Society, the total annual cost of which is only two dollars. Every effort will be made during the coming year to further increase our membership so that it will be more truly representative of the large body of undergraduates and alumni of the College of Engineering.

In subsequent messages on this page it is my idea to introduce to you in turn the chairman of each Regional Group and let him tell you what Cornell engineers in his territory are doing in the war effort. Some of the men you will know, others you may have heard about. All will be Cornellians and you can take a just pride in knowing that Cornell men everywhere are doing their utmost for the defense of their country.

Yours sincerely,
George N. Brown, '08

COMMUNICATIONS
. . . directing arm of combat

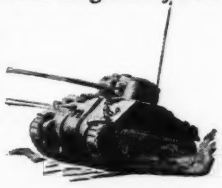


"Get the message through!" That's the tradition of the men who wear this insignia. Of the 18,000 Bell System people now in the armed forces, nearly 4,500 are with the Signal Corps. Young men can serve their country and obtain specialized training in communications in this great branch of the Army.

...and Western Electric equipment goes to every battle front

Army planes fly and fight with Western Electric radio command sets, which keep the planes of a squadron in contact with each other and with the ground forces.

Wherever American soldiers fight in tanks, they get their orders over Western Electric radio sets—vital in coordinating today's mechanized warfare.



Observers report front-line action to Army commanders over Western Electric field telephones, field wire, field switchboards.

A major source for this specialized equipment is Western Electric—for 60 years manufacturer for the Bell System—one industry with over 70,000 skilled men and women dedicated to *"keep 'em in contact."*

Western Electric

ARSENAL OF COMMUNICATIONS

ARMY E NAVY

The Engineer Comments . . .

STUDENT engineers should be doing plenty of serious thinking this fall. Have you already asked yourself some of these questions? Should I stay in school or should I enlist? Am I being a "slacker" by going to school instead of taking a more active part in the war? Was I right by working this summer instead of accelerating in my courses to graduate as soon as possible?

Our job right now is to stay in school. We must stick to it and stay put. Uncle Sam wants trained men in his army. He wants men of maturity, men that can be given a task to perform and follow it through until completed. Our task is before us, our job is to follow it through until completed.

Unfortunately, many of us will not have the opportunity to graduate. Yet as we strive for that which we desire we are training ourselves for greater service. While in school, we are in a position where we can be called for service at a minute's notice and yet disrupt the nation very little. Right now while we are learning at our most rapid pace, we have no dependents, we have no company officials depending upon our services, and we have no connections that cannot be rapidly broken for our immediate entry into the war. That is why we belong in school until we have completed our education or until our services are required directly.

Many of our classmates chose to work this summer instead of accelerating in their courses. If they chose to work this summer for the purpose of finding themselves and the training for which they were best fitted to contribute to our war effort, that was justification enough. A man who gets his feet firmly on the ground at the start and then sticks to it, is the one who is going places and always has gone places. Lets get our feet firmly on the ground right now. Are we of college caliber? If so, stick to it; if not make your decision now. Next year is going to be hard and we must face it now. We cannot afford to turn back later.

THIS summer our University has played host to over a 1000 ensigns. We are proud to have them with us. Later on this fall the number of ensigns will be stablized at 950 men. Of these 200 will be registered in Diesel engineering. The remaining 750 will be given a preliminary month of indoctrination followed by a five month course in communications in cooperation with the College of Engineering. You might be interested to know that when the ensigns enter our dormitories, they are aboard ship. The floors are known as decks, stairways as ladders, and the discipline is the same.

We have also played host over the summer to civilian employees of the Army Signal Corps, employees of the Rochester Ordnance District, and men and women enrolled in ESMWT courses given by the College of Engineering. We are all proud of the part Cornell is playing in our war effort and hope Cornell will continue to take the leadership in this field.

BLAZING THE WAY TO FASTER PRODUCTION

As EASILY as a knife cuts through pancakes, this white-hot oxy-acetylene flame zips through stacks of steel plates . . . turning out metal parts in a fraction of the time required by other methods.

Cutting as many as twenty plates at a time, this knife that never dulls . . . guided by positive templates . . . can follow the sharp twists and turns of highly complicated patterns. Oxy-acetylene stack-cutting saves shaping, machining, and assembly time. It produces parts of identical size and shape. It reduces scrap losses . . . makes possible substantial savings in subsequent machining and fitting operations.

Stack-cutting is only one of the many oxy-acetylene processes for cutting, fabricating, and treating metals which manufacturers are using to speed up production today. Whether cutting up scrap . . . or skinning steel alive by planing a light cut from the four sides of steel blooms as they speed down the roll table . . . or helping to shape and weld finished steel . . . the oxy-acetylene flame is a tireless worker in modern manufacturing.

Would you like to know how flame-cutting and other oxy-acetylene processes could be applied to your business? You are cordially invited to avail yourself of the store of knowledge Linde technicians have assembled over a long period of years.

• • •

The important developments in flame-cutting—and other processes and methods for producing, fabricating, and treating metals—which have been made by The Linde Air Products Company were greatly facilitated by collaboration with Union Carbide and Carbon Research Laboratories, Inc., and by the metallurgical experience of Electro Metallurgical Company and Haynes Stellite Company—all Units of Union Carbide and Carbon Corporation.

THE LINDE AIR PRODUCTS COMPANY

Unit of Union Carbide and Carbon Corporation

GENERAL OFFICES: *New York, N.Y.*

UCC

OFFICES IN PRINCIPAL CITIES

THE ALUMNI

Dean Smith Dies

ALBERT W. SMITH, M.E. '78, once acting head of Cornell University, died on August 16, 1942 after two weeks illness. "Uncle Pete", as he was affectionately known, had walked almost daily from his home on 13 East Avenue down the path to Willard Straight Hall, greeting friends as he went.

As an undergraduate, he was always interested in athletics, particularly in rowing. In his freshman year he rowed on the first crew from Cornell that was victorious in an intercollegiate regatta. In his succeeding three years of Cornell rowing, the varsity crew was never defeated.

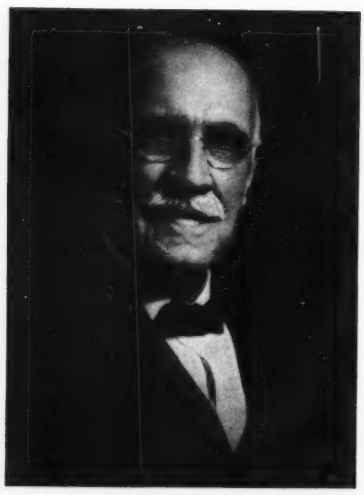
Having received his B.M.E. in 1878, Smith returned to Cornell as a student in 1887. He received his M.M.E. degree the following year and became assistant professor of mechanical engineering. In 1891 he departed for the University of Wisconsin where he was professor of machine design for two years. In 1892 he became professor of mechanical engineering at Stanford University where he remained until 1904.

In 1904 Smith returned to Ithaca as Dean of Sibley College and served in that capacity until his retirement in 1921. During 1920-21 the Trustees appointed Dean Smith Acting President of the University.

Dean Smith wrote several books among which were textbooks on Machine Design and Materials of Machines, biographies of Prof. John E. Sweet, Walter C. Kerr '79, and Ezra Cornell, and other books on Cornell.

He was a member of the American Society of Mechanical Engineers.

Dean Smith, M.E. '78



Grumman and Swirbul Honored

TRIBUTE to the aviation accomplishments of two Cornellians was paid in a recent issue of *Saturday Evening Post,* under the title "That's How Avengers Are Born." The Cornellians are LeRoy Grumman, M.E. '16, and Leon (Jake) Swirbul, M.E. '20.

Grumman is president, planner, designer, and financial genius of the Grumman Aircraft Engineering Corporation at Bethpage, Long Island. Swirbul is the vice-president who "translates drawings and blueprints into flying engines of destruction." an article says.

The firm first developed the Wildcat, a single-seat carrier-or-land-based fighter, which, over the Marshall Islands in February bagged ten Jap fighters and three bombers without any U. S. losses. The Avenger, developed after the Wildcat, looks like a medium bomber and carries either a 2000-pound bomb load or a full-sized torpedo. In the battle off Midway island last June, the Avengers had their baptism in combat and played a large part in the sinking of three Jap carriers and the rout of the Japs' 80-ship invasion fleet, according to the writer, F. S. Wickware. In April, Grumman was awarded the Navy "E" for efficiency.

The firm opened for business in January, 1930, in a converted garage, specializing in repair mechanics. Before long the two men became plane brokers and then started to build ships. They also have several mechanical developments to their credit, such as the improved retractable gear, which is commonplace today but was revolutionary in 1931. Today the plant has 10,000 employees as compared to 16 employees when the plant first opened.

William Gavett, M.E. '11

U of R Head Dies

GREAT is the loss of Professor Joseph William Gavett, M.E. '11, to friends both here and on the campus of the University of Rochester where he has served as chairman of the Engineering Department for the past 21 years. Professor Gavett died in his home on August 28.

After receiving his M.E. degree at Cornell in 1911, he returned in 1916 as an instructor, and later became assistant professor of engineering. This period from 1916 to 1921 was interrupted from 1917 to 1919 during which time he made photographic reports on engineering on the Western front, receiving a captaincy in the U. S. Army for his war work.

Always keenly interested in athletics, he was a member of the Cornell varsity crew as an undergraduate. At the University of Rochester he was an enthusiastic handball and volleyball player, and was

appointed in 1939 chairman of the newly created student-faculty Committee on Intercollegiate Athletics.

As director of the Rochester Engineering Society and the University Club, a trustee of the Rochester YWCA, a member of the accrediting board of the Engineers' Council for Professional Development and Tau Beta Pi, he was respected as a scholar and known as a warm and understanding friend by all.

C. Reeve Vanneman, C.E. '03

Rotary Committeeman

C. REEVE VANNEMAN, C.E. '03, consulting engineering on public utilities in Albany, N. Y., and past president of the Cornell Society of Engineers, has been appointed to three committees of Rotary International. He was named chairman of the Aims and Objects Committee and a member of the 1943 and 1944 Rotary Convention Committees. As Chairman of the Aims and Objects Committee, Mr. Vanneman will serve as advisor to the 210,000 Rotarians of more than 5,000 Rotary clubs in some 50 countries of the world.

Mr. Vanneman is a member and past president of the Rotary Club of Albany. He has previously served Rotary International as distric govenor, committee chairman, and third vice-president.

Cornellians' Plants Win Recognition

Two manufacturing concerns headed by Cornellians have been honored recently. Gleason Works in Rochester was honored for "high achievement" in war production with the presentation of the Army-Navy Production Award. The firm was the first in the area to receive the new award. James E. Gleason, president, received his degree in mechanical engineering at Cornell in 1890. His plant produces bevel gear cutting machinery vital in production of guns, ships, tanks, airplanes, bombers, and other fighting equipment.

John B. Hawley Jr., C.E. '21, president of the Northern Pump Company of Minneapolis, was credited by the United States Navy as having produced "the outstanding plant under Naval jurisdiction." The company is now engaged in making anti-aircraft guns and other types of weapons designed exclusively for the firing line. Hawley joined the firm as an "idea man" in 1924, and made enough money selling patents on his inventions to buy control of Northern Pump in 1928.

Army, Navy, or Marines! Where Is That Classmate?

WHERE is that classmate of yours today? Twenty-six percent of the class of '41 were in the armed forces immediately after graduation. However, 65% of last May's graduates were working for Uncle Sam by June, so we'll bet that your buddy is in the Army, the Navy, or the Marines. Here are the statistics for the Class of '42.

ADMINISTRATIVE ENGINEERS

Adelson, R. H.	U.S.N.R. Ordnance
Arenson, E. B.	U.S.N.R. Ordnance
Astry, P. D.	Naval Air Corps Cadet
Barrett, N. M.*	U. S. Army
Birckhead, L. M.*	U. S. Army
Boyle, J. N., Jr.	General Electric Company
Brown, E. H.	U.S.N.R.
Buxton, E. A.*	U. S. Army Field Artillery
Caperton, J. H.	U.S.N.R.
Carnes, T. S.*	U. S. Army, Signal Corps
Christensen, N. L.*	U. S. Army
Clarke, E. C.*	U. S. Army, Field Artillery
Crandall, H. K.	U. S. Army Air Corps
Chrichton, W. G.	U. S. Army Air Corps
Dingle, J. R.	U. S. Army Ordnance
Ford, R. E.	Cutler-Hammer, Inc.
Galdo, M. J.	Proctor & Gamble
Goodwillie, J. M.*	U. S. Army Field Artillery
Grover, R. E.	Scintilla Magneto
Gundlach, R. O.*	U. S. Army Ordnance
Guterman, F. H.*	U. S. Army Ordnance
Hammers, D. H.*	U. S. Army Infantry
Hart, J. W.	U.S.N.R. Ordnance
Hazelett, E. W.	Jack and Heintz Company
Hickenlooper, J. W.	Wright Areonautical Corp.
Hilke, J. L.	General Electric Company
Hogin, P. E.	Western Electric Company
Holub, E. M.	Linde Air Products
Howell, G. B.*	U. S. Army Field Artillery
Hurlburt, H. D., Jr.	Goodyear Tire and Rubber Company
Irving, C. E.*	U. S. Army Signal Corps
Jackson, J. T.*	U. S. Army Ordnance
Jones, H. L.	Naugatuck Chemical Company
Kositsky, R. G.	York Ice Machinery Co.
Laird, J. E.*	U. S. Army
Lander, R. A.	Vought-Sikorsky Aircraft
Levings, W. S.	York Ice Machinery Co.
Locke, J. H.*	U. S. Army
Mead, D. E.	U.S.N.R. Ordnance
Middleton, W. H.*	U. S. Army Field Artillery
Miller, J. C. Jr.	U. S. Army Air Corps
Munkenbeck, R. W.*	U. S. Army Ordnance
Ochs, R. C.	U.S.N.R. Ordnance
Otto, H. E. Jr.*	U. S. Army Ordnance
Peters, W. F., III	U.S.N.R. Ordnance
Read, W. R.	Carnegie-Illinois Steel Corp.
Riser, F. F.	U.S.N.R. Deck
Roe, M. E., Jr.	U. S. Army Ordnance
Rogers, P. E.	U.S.N.R. Aviation
Sabin, H. B.	R.C.A. Manufacturing Co.
St. John, H. M., Jr.	Hamilton Standard Propellers
Schock, H. E., Jr.	R.C.A. Manufacturing Co.
Scott, W. H., Jr.	American Can Co.
Severino, M. R.	U.S. Army Air Corps Cadet
Seymour, R. L.	U.S.N.R. Ordnance
Smithers, H. L.*	U. S. Army Field Artillery
Taylor, R. F.	U.S.N.R. Ordnance
Timmerman, L. D.,	Wright Aeronautical Corp.
Tunison, C. R.	U.S.N.R. Aviation
Upton, S. J.	American Can Co.
Whiting, W. B.	U. S. Army
Williams, A. D., Jr.,*	U. S. Army Ordnance
Witte, E. B.	No Information
Wolff, P. M.*	U. S. Army Ordnance
Woodruff, M. F.	U.S.N.R. Ordnance
Zuckert, W. M.*	U.S. Army Field Artillery

CHEMICAL ENGINEERS

Borst, J. R.	DuPont Explosives Dept.
Chrzan, L. R.	Sharples Chemicals, Inc.
Finn, R. K.	Merck & Co.
Gertzog, I.	U.S.N.R. Ordnance
Green, E. J.	Chemical Construction Corp.
Hathaway, F. S.	DuPont
Herrmann, R. H.*	U. S. Army Ordnance
Hinrichs, H. H.	Chemical Construction Co.
Lee, L. V.	U.S.N.R. Ordnance
Meyers, J. M.	M. W. Kellogg Co.
Miller, W. B.	General Chemical Co.
Nicoll, W. O.*	U. S. Army
Robinson, W. P.*	U. S. Army Chemical Warfare
Ruden, S.	M. W. Kellogg Co.
Ryan, N. W.	Standard Oil of Indiana
Smith, J. C.	DuPont Jackson Lab.
Sullivan, P. C.	Westvaco Chlorine Products
Weikart, J.	Standard Oil Development Company (N. J.)

(Over)

CIVIL ENGINEERS

Acker, L. M.	T.V.A.
Bean, J. W.*	U. S. Army
Boyer, J. L.	O'Driscoll & Grove
Brinckerhoff, C.*	U. S. Army
Burkhardt, D. T.	Bethlehem Shipbuilding Division
Burton, F. C.	Dravo Corp.
Calderon, A.	Division of Highways, Puerto Rico
Chalmers, J. R., Jr.	No Information
DeLia, S.	U. S. Engineers, Syracuse
Eberle, W. D.	No Information
Entenman, A. M.	U. S. Army Field Artillery
Go, M. L.	Mahony-Troat Construction Company
Goodkind, D. R.	U. S. Navy
Hansen, J. M.	U.S.N.R. Ordnance
Leighton, P. W.*	U. S. Army Field Artillery
MacDowell, R. L.	O'Driscoll & Grove
Mattern, J. F.*	U. S. Army
Milhan, D. W.	Graduate Work, Cornell University
Miller, E. G.*	U. S. Army Field Artillery
Peterson, L. E., Jr.	L. E. Peterson Co.
Rodriguez, L. F.	U. S. Army
Rosen, P.	Stone and Webster Engineering Company
Rothwell, F. N.	O'Driscoll & Grove
Shaw, J. W.	U. S. Engineers, Syracuse, N. Y.
Simpson, H.	O'Driscoll & Grove
Smith, W. P.*	U. S. Army Field Artillery
Sofair, M. N.	Seneca Ordnance Depot
Tripp, J. G., Jr.*	U. S. Army
Van Order, E., Jr.	Curtis Airplane Division
Ting, R. F.	J. G. White Engineering Corp.
Wagner, R. L.*	U. S. Army Field Artillery
Walker, E. S., Jr.	T.V.A.
Young, W. F.*	U. S. Army Field Artillery

ELECTRICAL ENGINEERS

Aldworth, J. G.* (A.E. in E.E.)	U. S. Army Ordnance
Burke, F. B.	U.S.N.R. Engineering
Burns, W. W., Jr.	U. S. Army Field Artillery
Cochrane, J. W.	U.S.N.R. Engineering
Critchlow, G. F.	Dravo Corp.
Dame, R. O.	Sperry Gyroscope Co.
Deabler, H. E.	No Information
Elfvin, J. T.	General Electric Co.
Gruen, F. E. (A.E. in E.E.)	Koppers Co.
Gurnee, R. McK.*	U. S. Army Signal Corps
Hollister, J. G.*	U. S. Army Signal Corps
Human, D. W.*	U. S. Army Signal Corps
Killian, J. W.	Western Electric Co.
Lipetz, L. E.	Signal Corps Radar Lab.
Lipkin, H. J.	M.I.T. Radiation Lab.
Littleton, J. C.*	U. S. Army Signal Corps
Lorber, R. P.*	U. S. Army Signal Corps
Matten, C. W., Jr.	Westinghouse Elec. and Manufacturing Co.
Mead, B. D.	Bell Research Laboratories
Noble, F. W.*	U. S. Army Signal Corps
Perkins, C. M.	U. S. Army Air Corps
Schley, L. L.	U.S.N.R. Ordnance
Schwartzkopf, D.*	U. S. Army Signal Corps
Skehan, J. J.*	U. S. Army Signal Corps
Sloughter, W. J.	Western Electric Co.
Smith, H. R.	Western Electric Co.
Sullivan, J. B.	Cutler-Hammer, Inc.
Thorne, S. R. (A.E. in E.E.)	Long Lines Department, A.T. & T.
Tredennick, H. L.*	U. S. Army Signal Corps
Williams, F. E. (A.E. in E.E.)	Bethlehem Steel Company
Wilson, T. M.	General Electric Co.

MECHANICAL ENGINEERS

Ayber, R. M.	Graduate Work, Cornell University
Avers, E. F.	Wright Aeronautical Corp.
Bacon, F. W.*	U. S. Army
Bouton, G. W.	Babcock & Wilson
Bridgman, R. A.	General Electric Co.
Brodhead, S. R.	U. S. Army Air Corps
Brown, I. P.	U. S. Army
Bull, G.	Sperry Gyroscope Co.
Caplan, F. Jr.*	U. S. Army Field Artillery
Converse, S. R.*	U. S. Army Field Artillery
Coors, R. M.	U. S. Army Air Corps
Cuniberti, M.	Wright Aeronautical Corp.
Davidson, J. F., Jr.	U.S.N.R. Ordnance
Dayton, J. H.	Eastern Aircraft Division, G. M.
Dowell, A. Y., Jr.*	U. S. Army Field Artillery
Dye, C. F. Jr.,	Detroit Diesel Engine Division, G. M.
Elizondo, H. R.	No Information
Fleming, W. C., Jr.*	U. S. Army Ordnance
Ghoreyeb, A. T.	Ranger Aircraft Engines
Gifford, F.	U.S.N.R. Aviation
Goslee, R. W.	Hamilton Standard Propellors
Graham, R. A.*	U. S. Army Ordnance
Graham, W. D., Jr.*	U. S. Army Signal Corps
Green, C., Jr.	Westinghouse Electric and Manufacturing Co.
Henderer, W. E., II	A. L. Henderer's Sons
Henrich, C. T.	Ford Instrument Co.
Herbert, W. F.	U. S. Army
Hu, T. W.	No Information
Hull, J. R.	U.S.N.R. Aviation
Jones, H. W.	U.S.N.R. Aviation
Jopson, H. S.	American Aniline Products
Kay, S. L.*	U. S. Army Ordnance
LaCroix, R. E.	U. S. Army Air Corps
Lawrence, W. C.	Inland Manufacturing Division, G. M.
Long, L. W., Jr.	U.S.N.R. Ordnance
McDonald, W. H.	U. S. Army Air Corps
McNulty, L. A.	General Electric Co.
Mead, D. E., Jr.	U.S.N.R. Ordnance
Merrill, M. M.	Ranger Aircraft Engines
Morrow, R. P.	Socony-Vacuum Oil Co.
Moulton, L. J.	Instructor U.S.N.R. Diesel Engine School
Nitchie, C. M.	Bethlehem Steel Co.
Novak, C. T.	U.S.N.R. Aviation
Orbison, F. H.*	U. S. Army Ordnance
Ornitz, M. N.	National Alloy Steel
Parker, J. B., Jr.*	U. S. Army
Putnam, A. A.	Dravo Corp.
Rebman, K. L.*	U. S. Army Field Artillery
Resek, R. B.	U.S.N.R. Ordnance
Schoedinger, F. P., Jr.	Curtis Airplane Division
Smith, R. G.	Ranger Aircraft Engines
Stamets, W. K., Jr.	W. K. Stamets Machine Tool Company
Taylor, R.	U.S.N.R. Aviation
Turner, H. L.	U.S.N.R. Ordnance
Voecks, W. F.	U.S.N.R. Ordnance
Walker, B. J.*	U. S. Army Field Artillery
Weiss, R. S.	U. S. Army Air Corps
Wells, D. R.	Vought-Sikorsky Aircraft
Wright, G. B.*	U. S. Army

*Graduate from Cornell R.O.T.C.

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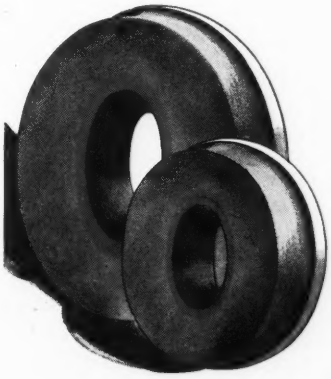

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Olin Hall

(*Continued from page 5*)

unit process laboratory and of the assistants who supervise this work are at the north end of the laboratory on the first floor.

The basement also contains special laboratories for housing gas-fired furnaces and for crushing and grinding equipment. These special laboratories are provided with outlet ventilating ducts connected to a separate fan and venting from the building separately from any other ducts.

Space is provided in the basement for a laboratory of electrochemical engineering and also for storage of acids and chemicals. A special room for storage of inflammable chemicals is protected by an automatic carbon dioxide fire extinguishing system which floods the room with carbon dioxide gas whenever the temperature rises to a point indicating danger.

Windowless Lecture Rooms

The first floor of the main wing contains three of the four lecture rooms, as well as the library, computation room, three of the five recitation rooms, and the school offices. By concentrating on the first floor and near the entrances these rooms which are used by relatively large numbers of people, traffic through the building is minimized and simplified.

The largest of the three lecture rooms on this floor, Lecture Room M, has a capacity of 300. The smaller lecture rooms, A and B, seat 140 and 94, respectively. All lecture rooms are equipped with folding theater-type seats with swing arm, and projection lanterns and screens.

All of these lecture rooms are built without windows. Illumination is provided by fluorescent lights so placed as to give uniform and ample lighting. Ventilation is by unit ventilators thermostatically controlled to maintain the desired temperature in the room.

The library in Olin Hall is primarily a working library for chemical engineering. No attempt has been made to build up a full reference library with complete files of all of the journals of even remote application to the work in chemical engineering, since unusually complete reference library facilities are available elsewhere in the University. One rather unusual feature of the library is the very comprehensive file of catalogues and trade publications.

In equipping the recitation rooms in Olin Hall, individual tables and straight upholstered chairs are provided instead of the more usual side-arm chairs. The arrangement adopted here provides much more working room for each individual student.

One somewhat unusual feature of the building is the provision of a kitchen and dining room for use in seminars and various meetings and social activities within the School of Chemical Engineering.

The second floor is devoted almost entirely to the individual unit laboratories for special and research work. Lecture Room R on the second floor is similar in its general construction and arrangement to the lecture rooms on the first floor.

Because of the increasing importance of chemical engineering in the fields of fermentology and food technology, a special laboratory for bacteriological work is provided on the second floor.

The third floor houses, in the main wing, a series of unit laboratories. The portion of the third floor above the wing on Campus Road is devoted to the laboratories for microscopy and metallography. In addition to the general laboratory for microscopy, special provision is made for metallographic work, including the heat treating of specimens of metal and the preparation of the specimens for metallographic examination.

Unusual Features

Some unusual features of construction and arrangement of Olin Hall may justify special mention. Except in the school offices and first-floor corridors, the interior walls are of cinder block, spray painted. This material provides excellent acoustic characteristics since the rough surface of the cinder block acts like acoustic tile to break up the sound waves that strike the walls. The cinder block has also the advantage of permitting easy attachment of fixtures without permanent defacement of the wall surface.

All services are carried from floor to floor of the building through vertical risers which are readily accessible for inspection and repair. On each floor the services are carried horizontally above the corridors. The removable panels which constitute the corridor ceilings permit easy access to the service lines above. Connections from the service mains in the corridor to the rooms on each side are made through openings in the cinder block walls.

Fluorescent lighting has been adopted as standard throughout Olin Hall, although incandescent lights are placed in storage rooms and in other rooms of only occasional and intermittent occupancy.

Special Labs

One unusual feature of Olin Hall is the rather large number of small laboratories designed for use by two or three individual advanced students working on research or on special problems. Each such laboratory is equipped with two runs of laboratory desks with alberene top and steel cupboards and with an alberene sink at one end. Each laboratory also contains a fume hood, study desk and tables, study chairs, and a coat locker. Service lines are provided above the laboratory desks and are also brought up underneath the removable plate near the center of the room so that special apparatus may be erected in the center of the room.

The arrangement and design of Olin Hall has been worked out to render the building effectively and conveniently useable as a laboratory for chemical engineering. Proper attention has been paid to architectural design but in all cases the principal factor that has guided the arrangement and the selection of materials has been the usability of the building for the purpose for which it was intended. This building should provide excellent facilities for laboratory and research work in chemical engineering at Cornell for many years to come.

Compressed Wood

(*Continued from page* 9)

sion. The pressure and temperature used depend upon type of resin and thickness of panel being pressed. If the volatile material has not been dried out in the previous processes, it boils out of the wood during the compression, carrying with it some of the resin; this results in a panel of uneven specific gravity and properties.

Increases Specific Gravity

The compression of these panels ranges between 35% and 55%. Using such compression, yellow birch, which has a specific gravity of .63, may be given a specific gravity of 1.36; and southern poplar, with a specific gravity of .48 to .52, may be given a specific gravity of from 1.24 to 1.3. In the table, page 9, comparative figures are shown for three types of laminated impregnated veneers together with red birch, 17ST aluminum, and mild steel. Though in the table the laminated veneer is shown to have a constant specific gravity, this can be changed to another constant or can be made to have a variable specific gravity in the same panel according to specifications.

The high density material thus produced is easily worked with both woodworking and metalworking machinery despite its hardness, adapting itself to immediate usage. It can be sawed, planed, and threaded.

Panels are made up for a finished thickness of from ½ inch to 1 9/16 inches. Thicker panels have not proven feasible as they are too costly to manufacture. If thick blocks are required, a number of panels may be glued together with cold setting resinous adhesives or with resins set by high frequency vibrations. From these blocks may be carved or turned the propellor blades as previously mentioned, or other structural parts as may be required. The British have been successful in using wooden blades, constructed from such material, in combat planes. Our own government is using them in training planes.

We have been so rich in metals that we have not developed the satisfactory substitutes as has Europe; but facing a long war and the tremendous postwar demands on structural building materials it is highly desirable that this high density material be given wider publicity and greater use.

Mech Labs

(*Continued from page* 10)

Cornell, and, by insisting on the importance of laboratory study of machines and materials, changed the course of engineering education in the United States.

Thurston's successor in charge of experimental engineering at Cornell was Professor Rolla Carpenter, who was a member of the faculty from 1890 to 1917. Subsequent heads of the Department of Experimental Engineering were Herman Diederichs, who became dean of the College of Engineering and died in 1937, and Prof. Adam C. Davis, who died last spring. Three departments have now been set up to

(*Continued on page* 30)

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The dominant consideration, now, is your immediate future. Many of you are enlisted in the reserve, or are already commissioned. You do have a valuable training which the country needs in this emergency. Make every day count in perfecting that training.

The war you will undoubtedly help to fight is not a nice war. But as we see it, the United Nations intend that it shall have not only a victorious ending, but also a hopeful ending—hopeful in the sense that we shall have a peace in which our goal shall be jobs for all men.

You have a right to know that industry is even now beginning to dream up the wherewithal for those jobs—new things to make, and new ways to make old things better.

A lot of everyday sort of men, many of them very much like yourself, doing this kind of thinking in the past, are the reason Alcoa Aluminum became the leader in the aluminum business. They are the reason Alcoa Aluminum will have such a big part in the future.

Call this kind of thinking Imagineering —letting your imagination soar and then engineering it down to earth. It is perhaps the most important talent a man can have. It is the point of view that industry will always need, and use, to make America a better place to live in.

There is no "pay-off" in this little message. We just wanted to have you know that folks like us can be completely devoted to high-speed war production, and have an eye on a good future for all men, at the same time.

A PARENTHETICAL ASIDE: FROM THE AUTOBIOGRAPHY OF

ALCOA ALUMINUM

• This message is printed by Aluminum Company of America to help people to understand *what we do* and *what sort of men* make aluminum grow in usefulness.

(*Continued from page* 28)

perform the general functions of Thurston's original laboratory, the Dept. of Materials Processing having been established some time ago to coordinate the work of the foundry, machine shop, and pattern shop.

Transferred to the new Mechanical Engineering Laboratory are Professors W. M. Sawdon, V. R. Gage, W. C. Andrae, and F. S. Erdman, and Dr. David Dropkin, Instructor and Westinghouse Research Associate. The Dept. of Engineering Materials will have Professor J. O. Jeffrey and three instructors; L. L. Otto, J. R. Young, and G. W. Ehrhart.

Scholarships

(*Continued from page* 13)

District No. 5 (South Eastern States)

Robert Jewett James, Charlotte, N. C.

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Edward T. Kornhauser, Louisville, Ky.
Joe H. Sheppe, Huntington, W. Va.

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Marguerite Erskine Haven Scotia
Morris S. Helitzer Bronx
Ferdinand Warner Herlitz New York
Alvah George Hinz Olean
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Inez Marian Leeds New York
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Donald Earl Orner Albany
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Gabriel Pesce Staten Island
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Claude Ernest Reeder Long Island City
Curt Reinhold Blauvelt
Stanley Franklin Reiter New York
Donald Charles Roberson Saranac Lake
Norwin Gerald Rosner Rochester
William Archibald Scofield Larchmont
Sanford Warren Seidler New York
Maurice Serotta Saratoga Springs
Robert Owen Sinclair, Jr. Clinton
William Arthur Sklarz Brooklyn
Martin P. Stancampiano Oswego
Alan O'Neill Sykes Canton
James Hatch Webber Port Jervis
Edward Ronald Wells Candor
Lester Valentine Wise Kew Gardens
Robert Theodore Yntema Mongaup

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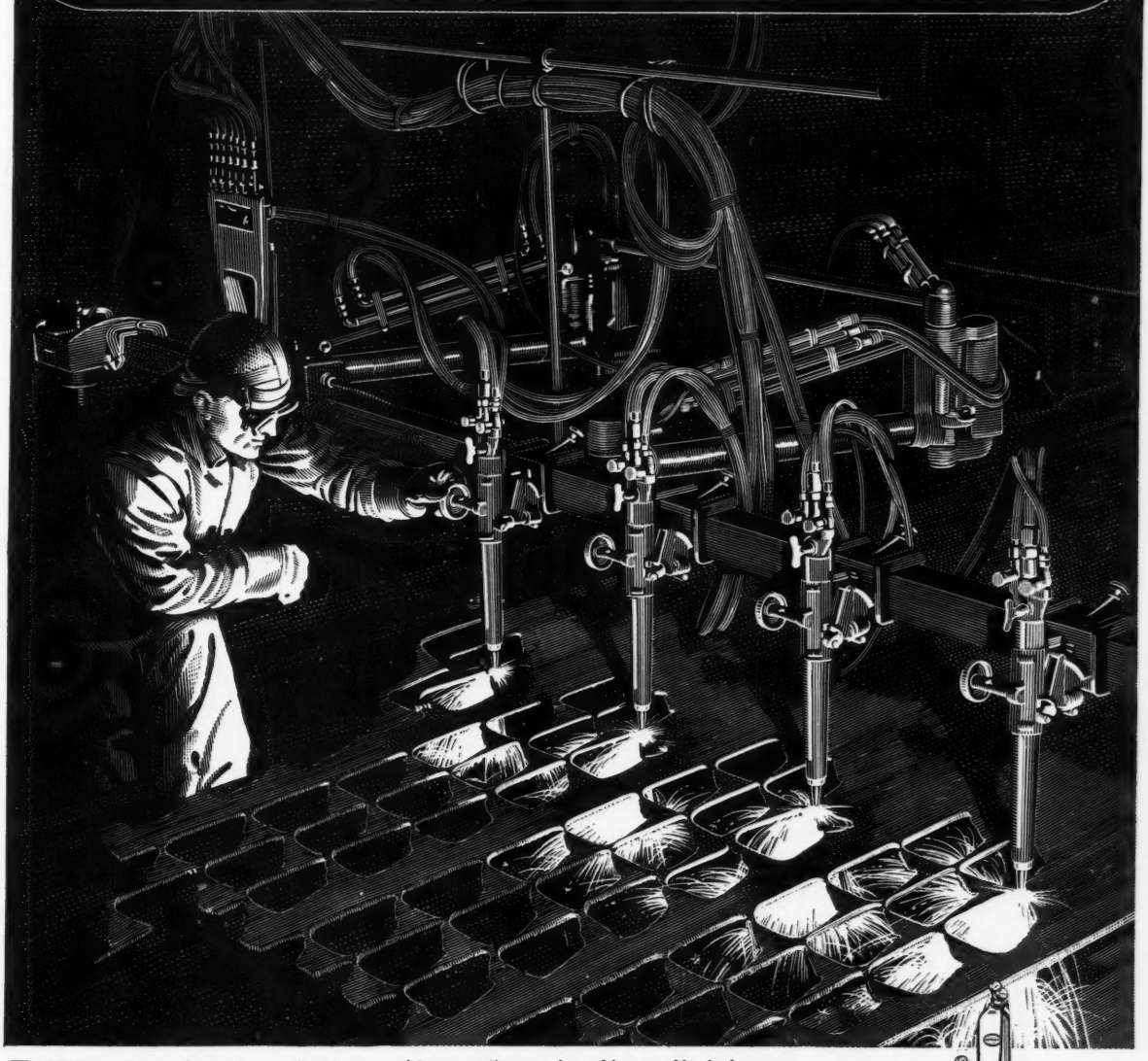
FLAMES ARE THE CUTTING TOOLS



EACH hour is worth ten in production time when steel plate for our machines, guns, tanks and ships are multiple flame cut by the Airco Oxy-acetylene Flame. Slicing its way through steel and iron, this white hot flame has revolutionized metal fabrication by providing a swift, accurate, economical method of shaping sheets, forgings, castings, structures and pipe. Size and shape which can be cut is practically limitless. A single piece or hundreds of identical pieces can be shaped to amazingly close tolerances. Changes in design require only new blueprints or templets to guide the torch.

Other defense jobs being done by this versatile metal working tool include hardening steel to any degree and depth; welding two or more metal parts into a strong, homogeneous unit; machining metals with unrivaled speed, and cleaning and dehydrating metal surfaces for long lasting paint jobs. To insure greatest speed, efficiency and economy in applying the Airco Oxy-acetylene Flame to defense production, Air Reduction offers industry the cooperation of a complete engineering staff.

To better acquaint you with the many things that this modern production tool does better we have published "Airco in the News", a pictorial review in book form. Write for a copy.

AIR REDUCTION

General Offices:

60 EAST 42nd STREET, NEW YORK, N. Y.

In Texas:

Magnolia-Airco Gas Products Co.

DISTRICT OFFICES IN PRINCIPAL CITIES

ANYTHING AND EVERYTHING FOR GAS WELDING OR CUTTING AND ARC WELDING

STRESS and STRAIN...

A young man whose father had been hanged was filling out a life insurance form. After the usual questions about hereditary diseases, there was one asking for the cause of death of his parents.

He wondered and finally put down this answer: "Mother died of pneumonia. Father was taking part in a public function, when the platform gave way."

* * *

She: Can you drive with one arm?

He: Sure.

She: Have an apple.

* * *

A man on the street met a friend walking along on crutches. Observing several bruises and bandages, he asked, "What happened?"

Well, I had a date with the girl friend. We were dancing when her father came. You know that he is slightly deaf. Well, he couldn't hear the music."

* * *

Newton's Seventy-Second Law:—The dimmer the porch light, the greater the scandal power.

* * *

Attention all frosh Chem E's:

Cyanide solutions should always be measured out in graduates, never in pipettes. If you use pipettes, there won't be any graduates.

* * *

Jimmie:—"What's the best way to teach a girl to swim?"

Johnny:—"Well, you want to take her gently down to the water, put your arm around her waist, and ———"

Jimmie: "Cut it out. It's my sister."

Johnny: "Push her off the dock."

Found: Woman's bag left in my parked car. If owner will pay for this advertisement, she can have it. If she will tell my wife how it happened to be there, I'll pay the cost of advertisement. Tel. Jeff 2600—the quicker the better.

* * *

Ten of our Ensigns were recently shipped out to Smith to teach the "WAVES". We wonder what they'll teach them after going with our coeds for 3 months.

* * *

Definitions

Bachelor:—A man with no children to speak of.

Tommyhawk:—What if you go to sleep and suddenly wake up without hair, there is an Indian with.

* * *

He:—"Since I met you, I can't eat, I can't drink, I can't sleep."

She (coyly):—"Why not?"

He:—"I'm broke."

* * *

Running after women never hurt anybody—it's catching them that does the damage.

* * *

Tourist Guide: We are now passing the largest brewery in the United States.

M.E.: Why?

* * *

Advice to rejected draftees:

Eat Kellog's All-Bran flakes, and you will end up by joining the regulars.

* * *

The professor who comes late is rare; in fact he is in a class by himself.

Late on the afternoon of the Sixth Day, when the Creator had made all of the good things, there was still some dirty work to do, so he made the beasts, reptiles, and poisonous insects. When He finished, there were some scraps too bad to put into the rattlesnake, scorpion and skunk. So he put all these together, covered it with meanness, wrapped it in selfishness, marked it with a yellow streak, and thus produced the chuckling sap who darts into a parking space when the car ahead is preparing to back in.

* * *

The Creator made us with two ends—one on which to sit, the other with which to think. Our success depends upon which end we use the most. Heads we win, tails we lose.

* * *

"Waiter, I want some oysters, not too large and too small, not too old and not too tough, not too salty, and they must be cold. I want them immediately."

"Yessir, with or without pearls?"

* * *

"Pop, I got in trouble today and it's all your fault."

"How's that, son?"

"Remember when I asked you how much a million dollars was? Well, 'Helluva lot,' isn't the right answer."

* * *

These were voted 'tops' as the three sweetest words in the English language:

1. I love you.
2. Dinner is served.
3. All is forgiven.
4. Sleep 'till noon.
5. Keep the change.
6. Here's that five.

And the saddest were:

1. External use only.
2. Buy me one.
3. Out of gas.
4. Dues not paid.
5. Rest in peace.

—Panther

While Victory is being won prepare for the work of peace. Learn to <u>know</u> <u>your bearings</u>.

TO ASSURE VICTORY
BUY UNITED STATES WAR SAVINGS BONDS & STAMPS

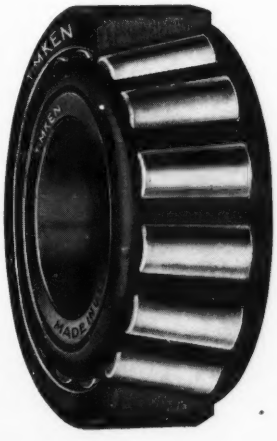
American planes, tanks, trucks, guns and warships are doing an outstanding job in the fight for freedom because, in addition to being good all-around engineers, their designers *know their bearings.*

After Victory, when we have made sure that the things our forefathers fought and died for shall not perish from the earth, *"knowing your bearings"* will be one of the most important assets you or any young engineer can possess.

For when the tremendous work of reconstruction starts, machines of all kinds will be required to have higher speeds, greater precision and endurance and be more economical to operate and maintain than ever before.

In achieving these objectives, Timken Tapered Roller Bearings will be used to an even greater extent than in the past because of their ability to meet—and beat—any and every bearing condition that might develop.

Now is the time to learn to know your *Timken Bearings.* Our engineers will be glad to help you.



THE TIMKEN ROLLER BEARING COMPANY, CANTON, OHIO

Manufacturers of Timken Tapered Roller Bearings for automobiles, motor trucks, railroad cars and locomotives and all kinds of industrial machinery; Timken Alloy Steels and Carbon and Alloy Seamless Tubing; and Timken Rock Bits.

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TRADE-MARK REG. U. S. PAT. OFF.
TAPERED ROLLER BEARINGS

U.S. Department of Commerce
Nat'l. Bureau of Standards
Washington, D.C.

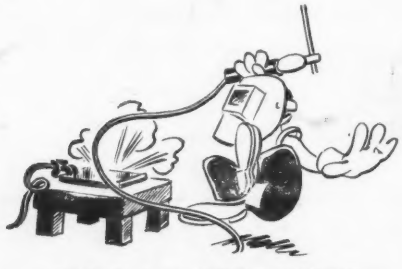
G-E Campus News

COLLECTOR

VINCENT J. SCHAEFER, of the G-E Research Laboratory, used to collect snowflakes, and because of his hobby metallurgists now have a simple method of observing details of metal structures far too fine to be seen with an ordinary microscope.

The young scientist's method of "casting" snowflakes in a film of Formvar has solved the problem of how to get a metal specimen thin enough to be examined in the electron microscope. (This device uses electrons instead of light to form the magnified images, and the electrons must pass through the specimen.)

A thin film of resin, stripped from the specimen and retaining all the details of the metal surface, can be placed in the microscope and be magnified as much as 100,000 diameters.



CALAMITY JOE

EVERYTHING happens to Joe.

And anything is likely to happen when he picks up the welder's electrode, because Joe MaGee, an animated cartoon character, doesn't know the first thing about welding. Throughout the new G-E instructional movie, "The Inside of Arc Welding," he seems to do the wrong thing.

But Joe does a good job of teaching you how *not* to strike the arc and how *not* to control the metal in the molten pool. His bungles, plus close-ups of the arcs in action, make this full-color film "one of the most helpful training aids ever offered to the welding industry."

The movie is in six parts. Each part (16 mm.) is complete in itself—a 10-minute sound production covering one particular phase of arc welding in full detail.

Organized groups may borrow the films with no charge other than transportation costs; schools and industry may buy single reels at cost—$52 each—for use in training welders. Write Campus News, General Electric, Co., Schenectady, N. Y.

SH-H-H-H-H-H!

THE one announcer in the country who can give weather forecasts over the air is a mechanical man who broadcasts from a point 12 miles up in the stratosphere, where next week's weather is in the making.

This mechanical investigator, whose heart is an electron tube, works for the U. S. Weather Bureau. He weighs only a couple of pounds and looks like a large box camera.

As a small balloon takes him up, the robot broadcasts the atmospheric conditions he finds. Tuned in with a ground receiver, the radio signals tell the temperature, wind velocity, etc. The balloon bursts at the low pressure limit (about 60,000 feet above ground), and a parachute brings the radio sonde, as it is called, down to earth.

The mechanical weatherman carries a calling card with his return address on it in case he gets lost on the way back.

GENERAL ELECTRIC

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